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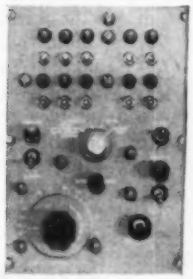
Sonobuoy ejector using "Pogo Stick" Free Piston Actuator principle.



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Pneumatic Actuator for opening skin door.

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PUBLISHING INFORMATION . . . **Published:** Every other Monday by American Aviation Publications, Inc., Washington, D. C. Printed at The Telegraph Press, Harrisburg, Pa. Entered as Second Class Matter in Washington and Harrisburg. **Subscription Rates:** For U. S. and Canada—$5.00 for 1 year; $8.00 for 2 years. Other countries—$7.00 for 1 year; $12.00 for 2 years. Subscription limited to aviation industry personnel. **Incorporates:** Airports and Air Carriers; Aviation Equipment; The American Pilot; Aviation Sales & Service; U.S. Aviation; and American Airports. **Change of Address:** Send old address (exactly as it appears on mailing label on your copy of magazine) and new address, including zone number if any to American Aviation, 1001 Vermont Avenue, N.W., Washington 5, D. C. Allow two weeks for changeover.

BPA NBP

NOVEMBER 4, 1957—VOL. 21, NO. 12

AMERICAN AVIATION

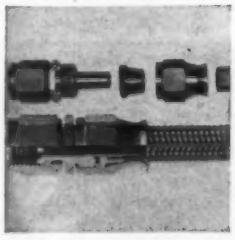
WORLD'S LARGEST AVIATION PUBLISHERS

How 'Far Side' launched rockets

After four failures, Air Force finally managed to get its balloon-launched rocket 4,000 miles into space Oct. 21. Purpose was to gather data on cosmic rays, other high-altitude phenomena. See page 31.

Profile of USAF's No. 2 man

Malcolm A. MacIntyre became Under Secretary of Air Force last June with the tough assignment of bringing program estimates down to size of money available. Personality sketch tells how he handles job. See page 36.



Resistoflex and reusable fittings

The fate of many a giant aircraft may hinge on the dependability of its hose fittings. How Resistoflex Corp. tackled problems of reusable fittings for hose assemblies is told by William Beller. Page 42.

Minneapolis-Honeywell's new plant

Giant step forward in gyro development was taken by Minneapolis-Honeywell when it built new $4.5 million vibration-free facility in St. Petersburg, Fla. Henry P. Steier, tells the story. Page 45.

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PHOTO CREDITS

Cameramen Incorporated, p. 36; Vapor Blast Company, p. 41; Douglas Aircraft, p. 46; Trans World Airlines, p. 65.

63,700 Copies of This Issue Printed.

In this issue . . . The eight regional trunklines are slowly gaining traffic at the expense of the Big Four airlines, an AMERICAN AVIATION survey reveals. Analysis by Transport Editor William V. Henzey, p. 29. Among other exclusive features is the first picture of the Russian RD-3 axial-flow turbojet for the Tu-104 transport, p. 61.

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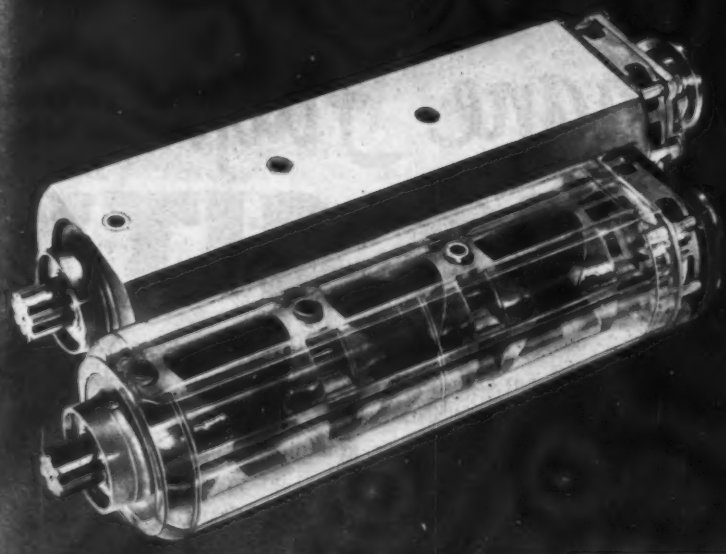

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Model Numbers	CM-710 *(illustrated)	CM-350	CM-160
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Max. Dia. Envelope (in.)	4.0	3.2	2.5
Weight (lb.)	22	15.5	7.5
Output at 200 psig supply pressure and 1200 rpm (hp)	18.5	9.1	4.2
Starting Torque at 200 psig supply pressure (inch-pounds)	1800	890	400

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U.S. Goal — First Manned Satellite

THE REACTION in the United States to the launching of the first earth satellite by the Soviet Union on October 4 has been quite extraordinary.

Sputnik was called a hunk of iron by one official who will live to regret his initial unthinking outburst. It was called a "neat scientific trick" by another. It was scorned as having no military value by still another. And it was said by a top Navy official to have interfered with the Soviet ICBM development because it was diversionary.

All of which shows how we in the U.S. often tend to lose our sense of values when we're taken by surprise.

Sputnik was certainly more than a hunk of iron and more than a neat scientific trick. It was one of the great achievements in the brief time man has inhabited the earth, no matter how much we regret that it was the Soviet Union and not the U.S. that made it a "first." And it certainly has enormous military significance—it was a live demonstration that the Soviet Union scientists had licked more than one baffling problem having a direct bearing on ICBMs.

It was the companion publication to this magazine, *Missiles & Rockets,* that has been reporting on Russian satellite developments and warning that they were getting close to launching their first. But skepticism and lack of understanding or comprehension of the over-all military and psychological advantage of being "first" sloughed off any major concern.

One aviation magazine even went so far—before Sputnik—to go into a rather extraordinary tizzy over the semantics of whether there is or is not a "missile industry" in an effort to detract from accomplishments to date of the Army versus the Air Force. The fact is that the description "aviation industry" has always embraced a whole series of "industries" and no one can deny that missile activity has long since become another "industry" within aviation with, of course, the bulk of the aircraft industry deeply and rightfully involved.

It is perhaps time to focus attention on the main objective and not continue to fiddle over trivialities. The U.S. took a shellacking among the hundreds of millions of have-not peoples around the world who have been on the receiving end of the cold war of two ideologies for their minds and loyalties. No one in this country seriously questions our over-all superiority of strength, resources and technical achievements, but to perhaps a billion and a half other people the Soviet Union moved far up the ladder in prestige and bargaining power.

The Soviet Union has a timetable for earth vehicles. There will be more and bigger satellites carrying more sophisticated instrumentation. In due course these vehicles will be carrying television cameras, infrared spotting and other equipment. It is clear that the Soviet Union wants to be first to reach the moon and to be first with a manned satellite.

The expressions "open skies" and "aerial inspection" are close at hand in reality.

What can the U.S. do? Number one is a coordinated program which only the top leadership of the country can bring about. Second should be a determination to be the first to launch successfully a manned satellite, with ample reporting and recording apparatus, and to return this satellite safely to earth. This can be done. It is more important than the scientific achievement of reaching the moon, which the Soviet Union stands a good chance of doing first anyway.

It's time to stop giving out alibis, or scoffing at Sputnik, or explaining why the U.S. wasn't first, or to disparage the military implications of a satellite. The first manned earth satellite should be our unswerving goal.

Orchids

To William T. Piper and Piper Aircraft Corp. for having produced their 45,000th airplane, highest congratulations on a truly impressive record.

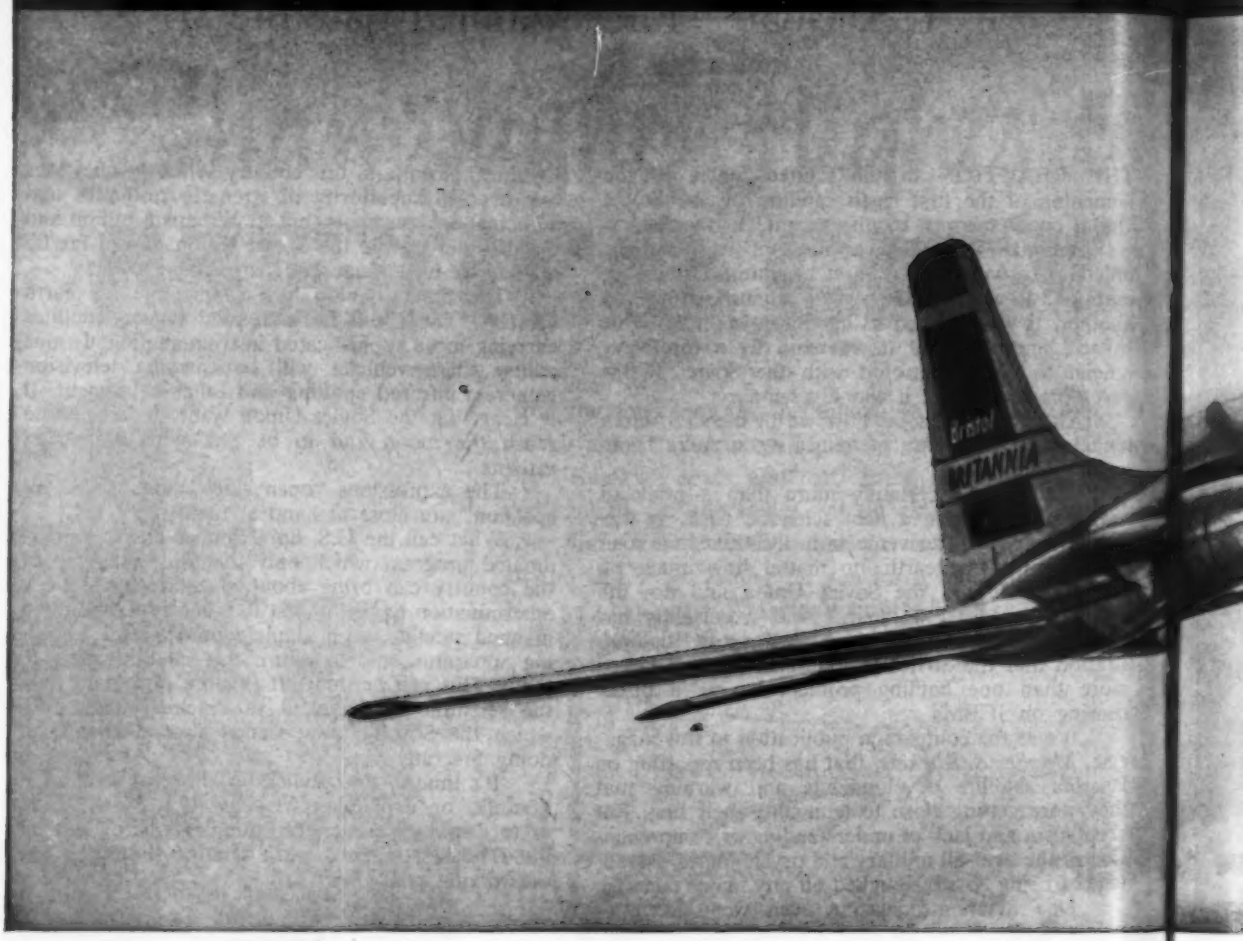
To General Orval Cook, president of the Aircraft Industries Association, and the AIA export committee, high praise for their current long-needed program of briefing U.S. civil air attaches on the U.S. aviation industry, its problems and its goals.

To Shell Oil Company for its magnificent new film, "Song of the Clouds," showing the universality of the world's airlines, our highest commendation. This film needs to be widely shown throughout the U.S.

Wayne W. Parrish

More about Bristol's "Whispering Giant": world's largest, fastest, quietest, jet-prop airl

INTER-CITY . . . . T



Inter-city or trans-polar . . . only the Britannia is a money-maker on such a vast variety of routes

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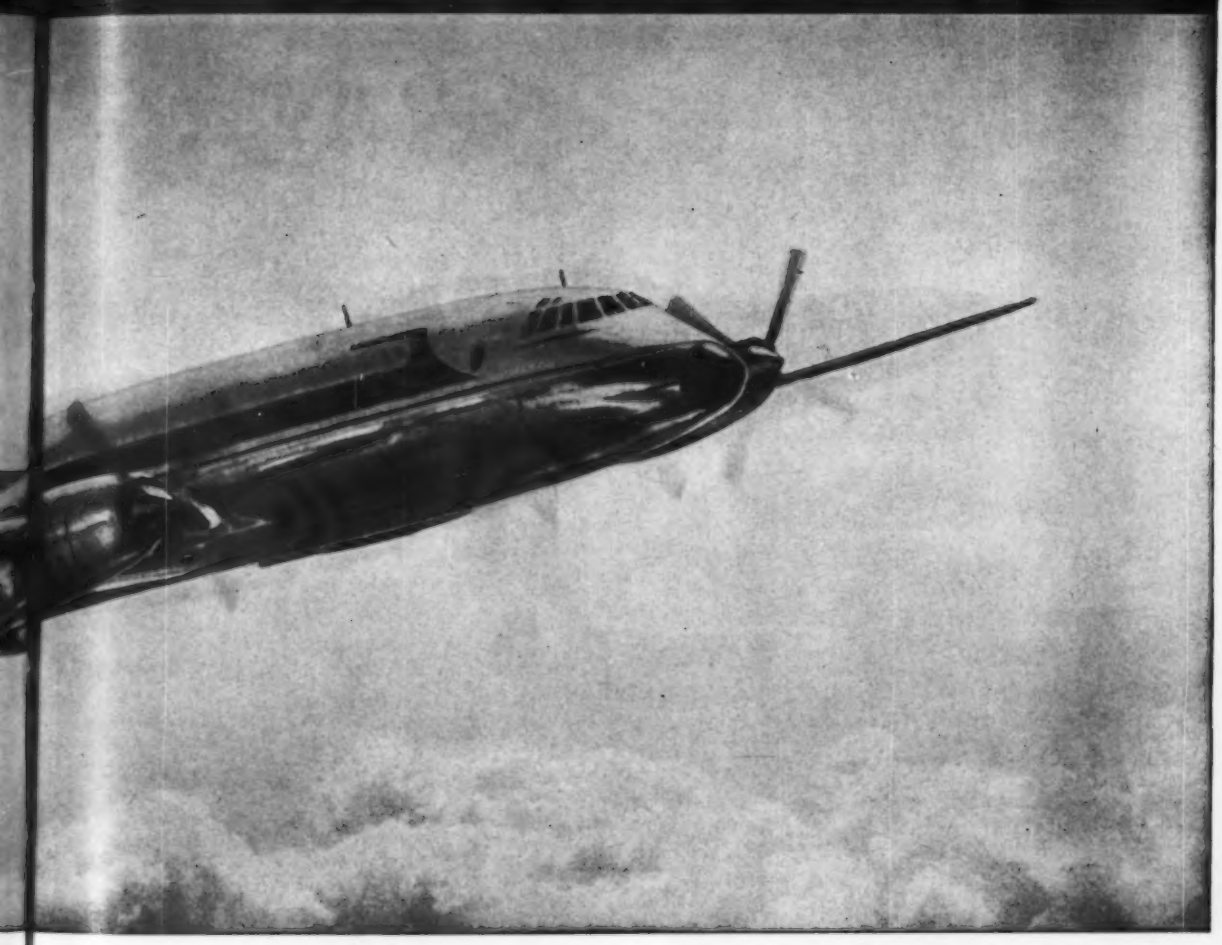
Her record shows her to be the most versatile airliner ever to fly. She has no noise, runway or traffic-control problems. Her remarkable flexibility allows her to use existing traffic patterns and runways almost anywhere in the world.

Operators have already chosen Britannias for an amazing variety of stage-lengths, from short 200-mile inter-city routes to long 4,500-mile trans-polar flights.

TRANS-POLAR



Britannias will be flown between Mexico City—New York by Aeronaves De Mexico; between Havana—New York by Cubana de Aviacion; and between New York—Washington and New York—Miami by Northeast. The same type of aircraft will be flown nonstop across the Atlantic by BOAC and El Al, and on trans-polar and trans-Pacific routes by Canadian Pacific.

Powered by four 4120 h.p. Bristol Proteus turboprop engines, the "Whispering Giant" cruises at 400 m.p.h., carries up to 133 passengers and cuts operating expenses to a new low.

World-wide recognition and demand:

Britannias are in service on BOAC routes spanning four continents and have been ordered by Aeronaves De Mexico, Canadian Pacific, Cubana De Aviacion, El Al Israel Airlines, Hunting-Clan Air Transport, Northeast Airlines, the Royal Air Force and the British Ministry of Supply.

BRISTOL

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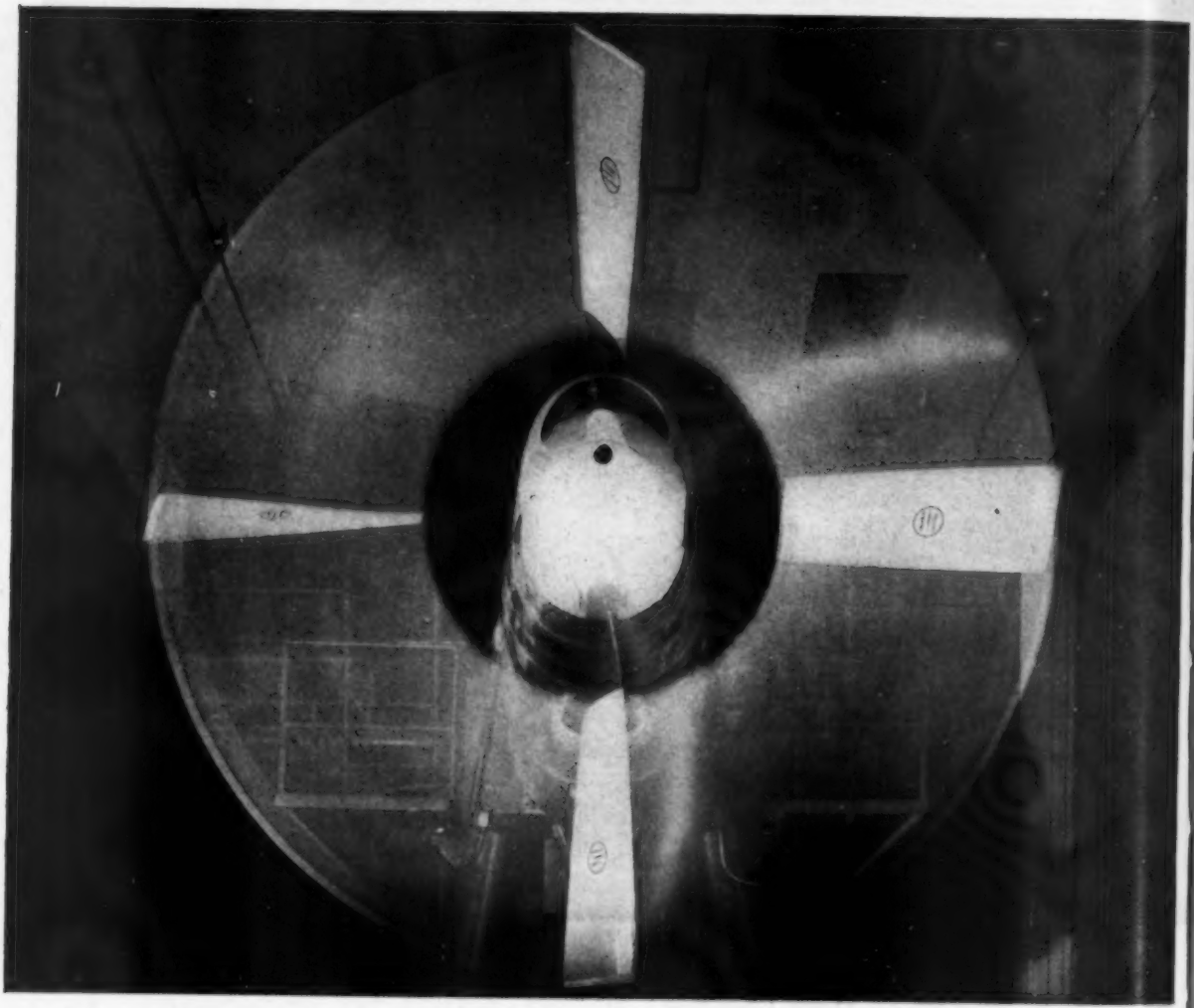
The Matched General Motors Power Team of Allison Prop-Jet Engines and Aeroproducts Turbo-Propellers Marks Another Milestone by Receiving CAA Approval for Commercial Operation



CAA AFFIRMS DEPENDABILITY OF ALLISON PROP-JET POWER. Another major step toward commercial airline operation of Allison Prop-Jet power in the Lockheed Electra has been accomplished with the on-schedule approval of the Allison Model 501-D13 Prop-Jet engine and Aeroproducts 606 Turbo-Propeller by the Civil Aeronautics Administration. Backing up the qualification test were 80,000 hours of development time on test stands, over 75,000 hours of experimental and service flight time and testing of engine components for an additional 50,000 hours. Approval of the CAA brings one step closer airline operation of this matched General Motors power team for the jet age in air transportation.

ALLISON DIVISION OF GENERAL MOTORS, Indianapolis, Indiana

GM AIRCRAFT POWER

ALLISON PROP-JET POWER

LETTERS

On realistic scheduling

To the Editor:

I agree with most of the things you write, but I strongly disagree with your leading editorial in the issue of September 9 dealing with realistic schedules.

As an extensive air traveler, I have always felt it was stupid public relations for airlines to customarily fail to adhere to schedules. A visit to any airport will disclose dozens and sometimes hundreds of unhappy people waiting around causing confusion because of late aircraft. The cost of handling passengers who miss connections and of answering inquiries about late aircraft must be staggering. In any other industry, it would be unthinkable to misrepresent the product to the extent that the airlines misrepresent their ability to adhere to schedules.

Possibly the method used by CAB in attempting to give the people who pay the bill a better deal is not the right method. The objective certainly is correct. Those of us who fly a lot know the chronic offenders and attempt to avoid using their lines. However, sometimes we have no alternative if we wish to fly.

It is amazing to me that many of the airlines do not have enough business sense to realize that it is good business to publish schedules which they can maintain. By doing otherwise, they not only commit a fraud on their passengers but render the whole industry a distinct disservice. *ROBERT ASH, Ash, Bauersfeld & Burton (Law Offices), Washington, D. C.*

To the Editor:

Some time ago I read your editorial concerning the CAB action on requiring a greater percentage of on-time performance from the airlines. While I agree that the best way to do this is not by regulation, certainly something needs to be done and I couldn't find any suggestion in your comments as to what. In the process of meeting about 45 airline flights during the past six months in connection with our air taxi operations, and in addition having been a passenger on about eight other flights, I can count the on-time arrivals on the fingers of one hand.

Reasons (or excuses) varied from the usual one of ATC delays to the not-so-usual one where we were 45 minutes late leaving Washington National because the stewardess got caught in the afternoon traffic. The point is, any airline pilot can tell you that the times printed in the timetables mean practically nothing. This is neither right nor fair to the traveling public who deserve something a bit more realistic.

Several years ago I tried to get some of my airline friends to adopt a more realistic approach and adopt a slogan in the case of a particular line of "the on-time airline." They refused on competitive grounds. I still think it would have paid off and now I see that Braniff has adopted this slogan. I hope they really try to live up to it. Certainly it shouldn't be hard to average the delays due to ATC and weather between, say, New York and Chicago, and come up with a schedule that could be kept 90% of the time or better. The same between other points. It certainly isn't fair to the customer to have to live with the present record of about 90% late performance and if Federal regulation is the only way we can get action, then so be it. Have you a better idea? *SAMUEL FREEMAN, NATA Advisory Committee. Somerset Air Service, Bedminster, N. J.*

Aer Lingus and alcohol

To the Editor:

There are those of us in Europe who have followed with interest, some little amusement and no little wonderment, the various statements made in the U.S.A. in regard to the service of alcohol in-flight and we cannot but ponder on utterances such as that made by Mr. Clarence N. Sayen, President, Air Lines Pilots Association, to the effect that "there is no question but what the service of alcohol in a confined space where an individual is captive for extended periods and subject to a strange environment creates serious safety and social problems." There are carriers in this part of the world who, for twenty-five years and longer, have provided their passengers with alcohol whilst in-flight and in Aer Lingus we have sold about a million dollars worth of drink on our flights in past years without encountering either serious safety or social problems.

Certainly we have occasionally—though very infrequently—experienced trivial incidents but these have caused no

anxieties and no great unpleasantness for our captains or for our cabin attendants. Admittedly we are a short-haul carrier.

Sober passengers in-flight and not so sober passengers on the ground have from time to time created for us worse headaches than have the comparatively unusual cases of inebriation in the air.

Needless to say our captains have the authority to order the closing of the aircraft bar if and when, in their judgment, the need to do so arises. Only very rarely has this ever been done.

Experience indicates that passengers who know they can order, within reason, drinks of their own choice and have them served in a glass—with ice, lemon, tonic, seltzer or what have you—do not bother to bring aboard their own stocks for "in-flight consumption." This is, in our view, a desirable state of affairs.

In some 5,000 hours of "cabin flying" in aircraft on which drinks are served, I have not seen one solitary case of serious misbehavior arising out of intoxication caused by the serving of drinks in-flight.

American pilots travelling as passengers on any Aer Lingus service are hereby invited to "have *one*" on me! *MAX STUART-SHAW, Assistant General Manager, Aer Lingus, Dublin.*

Drinking vs. bureaucracy?

To the Editor:

I noted with interest your reply to Rowland Quinn's letter concerning airborne drinking in your Sept. 9 issue.

It appears that properly controlled drinking is easily possible by self-imposed regulations of enlightened airlines. This would parallel the movies' Johnson office and trucking companies' safety organization.

As yet, no effective means has been found of controlling runaway bureaucracy and red tape, once a government department gets its hooks into an issue. I wish the airlines and the overburdened U.S. taxpayer good luck in combatting the governments continuous attempts to regulate yet another facet of private life and industry. *RAY ARNESEN, E. Rockaway, N. Y.*

Salvage or waste?

To the Editor:

From what I read in AMERICAN AVIATION such as enclosed article (AF to Scrap 200 B-36s for Salvage—Ed.) it would seem that there should be many red faces in Washington.

It would appear that Congress could do better by the American people if it would put a halt to so much waste in the military services and put the taxpayer's money to a much better use, namely better support of the public utility called the airline industry.

For the life of me I can't understand how an industry like the airline industry, which is legally a public utility and is highly, very highly, regulated by the Congress of the U.S., can possibly continue to exist under so much abuse. The airline industry, with so much at stake if not regulated with care and realistic policies, can set off an economic storm that will surpass all other known economic storms.

Will you kindly explain the meaning of the statement, "Asked CAB to retract its approval of all provisions of travel agency resolutions of ATA and IATA which conflict with the subcommittee views."

Seems to me an investigation of the airlines would be in effect an investigation of how well or how bad the House of the U.S. has handled its responsibility to the American people. *JACK WOLFE, Manager, Irving Cobb Hotel, Paducah, Ky.*

For the record

To the Editor:

The old-timer in aviation (AMERICAN AVIATION, Sept. 9, 1957, p. 95) should, in all fairness to the Air Force and Army, be put on the right track. The Army does make extensive use of Air Force testing installations in all parts of the country including Wright-Patterson. The U.S. Army Aviation Board, which conducts user tests of aviation equipment for the Army, has found the Air Force extremely cooperative in making available their facilities.

Both of these services have contributed to the existing cordial relationship and mutual problems are continually falling before this sensible arrangement. *WILLIAM E. VANCE, Editor, United States Army Aviation Digest, United States Army Aviation School, Fort Rucker, Ala.*

Applause for Saint

To the Editor:

Sam Saint's column on Ernie Cutrell was real topnotch. *E. A. POST, Manager, Radio Systems Laboratory, Stanford Research Institute, Menlo Park, Calif.*

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NOVEMBER

Association of Local & Territorial Airlines, Fall Meeting, Western Hills Hotel, Fort Worth, Texas. Nov. 4-5.
Third Aeronautical-Communications Symposium, IRE-PGCS, Utica, N. Y., Nov. 6-8.
Airline Finance and Accounting Conference, ATA, Miami Beach, Nov. 6-8.
Weapon system management meeting, IAS, Statler-Hilton Hotel, Dallas, Nov. 7-8.
Plastics for Airborne Electronics, regional technical conference, Society of Plastic Engineers, Hotel Ambassador, Los Angeles, Nov. 11.
Air Traffic Conference, fall meeting, ATA, Key Biscayne Hotel, Miami, Nov. 11-13.
Instrumentation conference and exhibit, IRE, Biltmore Hotel, Atlanta, Nov. 11-13.
Radio Fall Meeting, Electronics Industries Assn., IRE, King Edward Hotel, Toronto, Canada, Nov. 11-13.
International Air Safety Seminar, Flight Safety Foundation, Palo Alto, Calif., Nov. 11-15.
Vickers, Inc., hydraulics conference, Park Shelton Hotel, Detroit, Nov. 12-13.
Mid-America Electronics Convention, IRE, Municipal Auditorium, Kansas City, Mo., Nov. 13-14.
National Aviation Trades Assn. convention and National Air Taxi Conference, Hotel Adolphus, Dallas, Nov. 13-15.
Wings Club annual dinner, Waldorf-Astoria, New York, Nov. 18.
IATA, 10th technical conference, Miami, Nov. 18.
National Defense Transportation Assn. convention and forum, Shoreham Hotel, Washington, D. C., Nov. 18-21.
Aviation Distributors and Manufacturers Assn. meeting, Sheraton-Cadillac Hotel, Detroit, Nov. 21-22.
ATA annual membership meeting, Washington, D. C., Nov. 26.

DECEMBER

ASME annual meeting, Hotel Statler, New York, Dec. 2-5.
American Rocket Society annual meeting, Hotel Statler, New York, Dec. 2-6.
Symposium on high temperature strain gauges, Aeronautical Structures Lab., Naval Air Materiel Center, Philadelphia, Dec. 4-5.
Eastern joint computer conference and exhibition, IRE, ACM, AIEE, Sheraton Park Hotel, Washington, D. C., Dec. 9-13.
Air Traffic Control Symposium, Franklin Institute Laboratories, Philadelphia, Dec. 16-18.
Wright Brothers Lecture, IAS, Dept. of Commerce Auditorium, Washington, D. C., Dec. 17.

JANUARY

Annual meeting and engineering display, SAE, Sheraton-Cadillac and Statler Hotels, Detroit, Jan. 13-17.
IAS annual meeting, Sheraton-Astor Hotel, New York, Jan. 27-31.

MARCH

ASME Gas Turbine Power Div. conference and exhibit, Shoreham Hotel, Washington, D. C., March 2-6.
ASME Aviation Div. conference, Statler-Hilton Hotel, Dallas, March 17-20.

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AIRTRENDS

USAF's basic research program is in a state of confusion as a result of the welter of contradictory economy directives passed down to the Office of Scientific Research. It now appears doubtful that OSR will be able to negotiate any new contracts for basic research until some time next month.

USAF initially slapped a spending ceiling of $13 million on OSR, then revoked it after objections from the universities that would be affected. Next, OSR was told to shake down its contracts by 5% across the board. It had processed roughly one-third of its 650 contracts by last week when Defense Secretary Neil McElroy decided against economizing in the basic research area.

The result: OSR's small staff of contracting officers must now revise all the contracts they have already reduced, and it will not be until some time in December that they can start with new awards. OSR usually starts its new contracting in July.

Competition between Boeing and North American for the important WS-110 chemical bomber assignment is growing intense as the day approaches for a USAF decision between the two designs. It now looks as if it will come in late December or early January.

USAF may be expected to ask Congress for a substantial appropriation in its fiscal 1959 budget to support hardware development for the bomber. It asked $24 million during the current year for WS-110 studies and windtunnel tests. General Electric will supply the engines. Present engine designs are geared to conventional JP fuels, despite reports that they will use special high-energy fuels.

Cost of materials to build aircraft and missiles has been shooting up faster than price of other materials. Bureau of Labor Statistics' overall Consumer Price Index, representing a wide variety of products and services, stood at 121 for August, 1957, using 1947-49 as the base of 100. Wholesale price index for all industrial products was 125.9 in the same month. But Aircraft Industries Association computed wholesale index price of aircraft material at 152.4.

Capitol Hill investigators are probing numerous phases of the U.S. missile and aircraft picture. As aviation activities captured the spotlight, there were these developments:

Senate leaders received preliminary findings of a survey of the missile program and weighed the next move. Only factor that would delay a full-scale investigation is trouble developing new facts. Both Senators Richard Russell and Lyndon Johnson are leery of a "headline-hunting" probe for old skeletons. They want the record to show conclusively how U.S. stands in relation to Russia. Task will fall to full Armed Services Committee or Senate Preparedness Subcommittee.

Rep. Tom Steed (D-Okla.) ordered a preliminary survey of the aircraft industry to examine the impact of sharp cutbacks on small business.

Special Senate Commerce Subcommittee began a study of Military Air Transport Service. High military officials are to receive questionnaires. From the answers, investigators will compile MATS' traffic—to show whether or not an unreasonable volume is being diverted from civil carriers.

Air Materiel Command is phasing out five of its seven U.S. depots and all its storage stations. In a year, AMC will be down to eight air materiel areas and two depots in the U.S., in addition to headquarters at Wright-Patterson AFB. Some overseas installations also are expected to be closed. Depots affected: Maywood, Calif.; Gadsden, Ala.; Shelby, O.; Memphis and Topeka. About 13,000 personnel are involved, many of whom will be reassigned. Reasons for shutdowns: recent modifications of USAF structure, directed reductions in personnel resources, ceilings on obligations and expenditures.

DIGEST

McElroy assures contractors government will reimburse them for special interest payments

The Defense Department assured contractors last week that they will be reimbursed for the cost of any borrowings they may have to undertake to maintain their delivery schedules. But it still had not issued the final word on how much the contractors may have to borrow from banks and other financial sources.

Defense Secretary Neil McElroy declared that the military services will pay their bills as they fall due, but said some contractors will be asked "to support on a continuing basis a somewhat greater proportion of their inventories and work in process with their own funds pending completion and delivery of the end-items."

"These increases in contract investments will be worked out through negotiation with contractors," McElroy's announcement said. "Moreover, it is to be understood that capital investment by the contractor will be taken into consideration in determining fixed fee or allowable profit."

It now appears that the Defense Department will spend approximately $19.4 billion, exclusive of foreign military assistance, in the July-December period of the fiscal year. This is $400 million more than the goal set by former Defense Secretary Charles Wilson, but there is apparently a feeling within the Administration that the extra amount can be managed within the tight ceiling on the national debt, provided it is made up in the last half of the fiscal year. Thus the overall ceiling of $38 billion for total fiscal 1958 military expenditures remains intact.

It appears likely that the extra spending leeway in the first half of the fiscal year will reduce the amounts of borrowing the companies will have to undertake. Estimates had run as high as $1 billion, but lowest estimate of $800 million, submitted to Air Materiel Command, may be closer. The $400-million cushion presumably will lower the drain on the banks and the companies, but will not eliminate the need for company financing.

Prior to the McElroy statement, speculation was growing that President Eisenhower might authorize exceeding the fiscal year spending by 2%, or $760 million. It was based on reported concern in top government levels over substituting company borrowing for government borrowing. Federal Reserve reportedly was quietly investigating possible effects on the overall economy of the Air Force plan. There were fears it might be the last push to start a panic in the wrong direction.

Definite figures lacking

But at presstime, there was still no definite word on just how much the individual companies would have to carry. All McElroy said was: "Some Defense contractors will be asked to support on a continuing basis a somewhat greater proportion of their inventories and work in process with their own funds pending completion and delivery of the end items. This should give defense contractors a greater incentive for reducing inventories and work in process to a level no higher than that required for efficient operations."

McElroy further instructed the service secretaries to advise him personally of any specific further cuts which "may appear" necessary to stay within the current $38-billion budget objective. He also cautioned prime contractors not to place an "undue hardship" on subcontractors or "importantly affect the subcontractors' abilities to continue production." He instructed subcontractors to get in touch with the services' assistant materiel secretaries if they feel they are not being fairly treated.

Defense's decision to reimburse interest payments as a capital investment or allowable profit was not unexpected. But reaction was not uproarious. As one industry official pointed out, higher profit rate will mean higher taxes. Hence, contractors will be able to recoup only a portion of the interest payments.

While the companies are going along with the Air Force, some firms feel the raising of the debt ceiling is the only answer. "This is all a sham," one official told AMERICAN AVIATION. "We'll all end up financing through the Federal Reserve anyway. It's the same thing as raising the national debt anyway, but through a phony route."

Air Force, still moving numbers around, has changed payment quotas twice during October. Its original request was for companies to try to reduce monthly billings by $364 million. But cumulatively the companies could only get it down $200 million.

Confusion still prevails

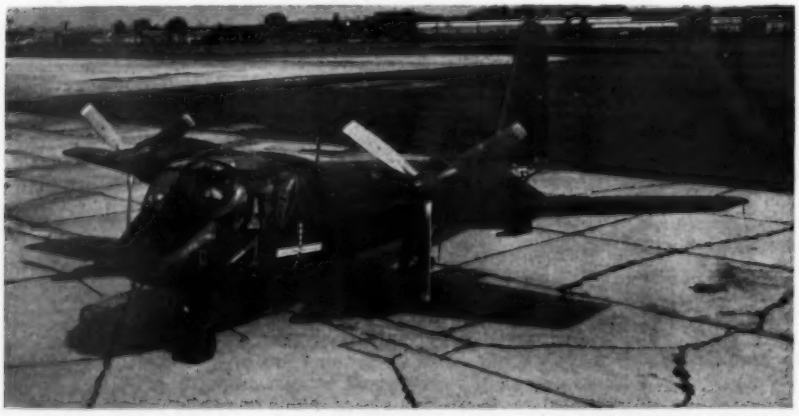
So, as the chess game continued, contractors were sitting in a confused state. Bank negotiations have gone as far as they could without definite word on how much money would be needed, for what length of time and for what specific purposes. Payments, particularly to subcontractors and suppliers, were dwindling—with some as far behind as 60 to 90 days.

In the Fort Worth-Dallas areas, Convair and Temco were the most directly affected—although Bell Helicopter Corp., working primarily on Army contracts, was in a slowdown. Defense release of funds has been held up pending resolution of the Air Force situation and the Army still had no money with which to sign major contracts with the rotary wing firm.

Convair has reduced both personnel and overhead by 20% each. Apparently willing to finance its B-58 program within its borrowing capability, officials expected no slip in the supersonic bomber project, which is progressing on schedule. Further overhead reductions through more force cutbacks may be necessary, however. But Convair currently is concentrating on inventory by surveying costs and quantities of materiel needed.

Temco, as one of the country's

Turboprop mockup unveiled at Army show



ARMY'S NEW ENTRY in turboprop field is the Grumman AO-1 Mohawk. Identical to Marine Corps OF-1, above, aircraft is powered by two Lycoming T-53-L-3 engines mounted in nacelles above wings which span 42 ft. Overall length of two-place observation plane is 42 ft. 9½ in. Mockup was shown at Fort Myer, Va.

largest subcontractors, was squeezed harder. As soon as it is notified by its prime contractors as to what it is expected to finance, Temco is ready to extend its $18-million line of open credit.

Temco also has asked its suppliers to carry some of the load and reduce costs. Temco procurement teams have been sent to suppliers to discuss how cost can be kept down.

Subcontractors in other areas of the country were not faring as well. Strategic Industries Association reported that Defense cutback has affected 40 to 50% of its membership of more than 100 companies. Concerns are experiencing difficulties in collecting on much of the remaining work. One firm in Southern California reported its paying its bills on a 60- to 90-day basis. Another firm in the midwest has advised suppliers payments will have to be deferred for 60 days as of November 1. Still another is reported asking suppliers to take 85% on their vouchers.

Contractors spell out needs

A minimum of $500 million in additional borrowings will be required from the banks for Air Force contractors in Southern California (including both the Los Angeles and San Diego area) to cover unpaid balances they will be forced to carry by the Air Force payment ceiling order.

This estimate was given in a communication from the Los Angeles Chamber of Commerce to the Air Force urging that the government take action to pay the interest charges imposed by these additional borrowings which the companies will have to make to continue to operate.

In notifying the companies of its plan to pay later on 25%—or more—on present contracts, Air Force had stipulated that it did not intend to reimburse them for this extra cost in doing business. The California document protesting this policy was delivered personally by Charles B. Ducommun and Harold Wright, president and general manager respectively of the Los Angeles chamber, to Air Force Secretary James H. Douglas in Washington.

The effect of the Air Force's money crisis, which the chamber letter described as a "failure of government," not of industry, will be felt by 510 prime contractors employing nearly 300,000 workers in Southern California, plus approximately 10,000 subcontractors and suppliers, and may seriously endanger the economic health of the area, it was charged.

The chamber reported that the banks have indicated they will be able to handle the financing the companies would need, but pointed out that the interest charges would amount to 4¾ to 5%, or enough to create a serious cost problem if there are no reimbursements under the contracts.

The money crisis, the chamber said, is not expected to last more than nine months, but the effect on the efficiency of the companies could be extended over a long period. It also hinted that what it termed a "measurable maladjustment" in the second largest metropolitan area in the country might be enough to trigger off a rapid business recession throughout the nation.

Aviation executives were inclined to agree with the chamber's estimate of $500 million as the amount the Southern California aircraft companies will have to borrow if they attempt to maintain production schedules, but so far the companies have remained silent as to individual needs.

"How can we estimate an amount until we learn exactly where we stand?" asked one manufacturer.

Some of the unanswered questions undoubtedly will be resolved from the Air Materiel Command's meeting held with presidents and top-level financial officers of the companies which took place at Dayton Oct. 25. Each company executive was to have been given an allocated period of time to present his views.

Most of the aircraft people seem to think that the government would agree to a plan of reimbursement on the interest charges, either in whole or in part. This will not save the day entirely, however. More cutbacks and stretchouts are generally regarded as inevitable before the financial tangle is straightened out.

Biggest borrower among the Southern California companies will be Convair—if, of course, it attempts to keep going at present rates on both its Atlas ICBM and fighter programs at San Diego and the B-58 bomber at Fort Worth, as it has indicated it intends to do if at all possible. But how much Convair's private financing will run to is still to be determined, San Diego bankers say.

Douglas Aircraft Co., which previously had arranged a $150-million line of bank credit primarily for the DC-8 jet transport, has advised the Air Force it believes it will be able to handle any necessary private financing. Up to this time, Douglas has not had to borrow any money.

Lockheed Aircraft Corp. has a $60-million line of bank credit and currently is using $30 million, mostly on the Electra turboprop transport. The remaining $30 million will be used up fast by the payment cuts and Lockheed undoubtedly will have to make arrangements for substantial new financing.

North American Aviation has a $100-million line of bank credit but is currently using $75 million. Company has not indicated whether it could extend this credit line or not to help the Air Force meet its obligations.

One of the peculiarities of the Air Force's payment ceiling program is that it doesn't apply alike to all companies. Companies not on the list for the cuts are going along fat and happy as ever. For example, Boeing Airplane Co., which makes the Bomarc missile, is hard hit by the order, but Marquardt Aircraft Co., which makes the ramjet engines for the Bomarc, is unaffected on engine program and its only reduction so far is layoff of 125 workers as result of stretchouts on F-104 and F8U for which it makes auxiliary air turbines.

Three congressional committees launch probes of U.S. missiles, rockets and satellite programs

Three key congressional committees are investigating the U.S. defense in the wake of new Soviet missile and satellite advances. In an effort to get to the bottom of charges that inept U.S. policies allowed the nation to slip behind the Russians, lawmakers:

Ordered the House Military Appropriations Subcommittee to launch a full-scale study of the missile and satellite programs with a stress on the effects of interservice rivalries.

Launched a preliminary survey of the Defense Department's missile and rocket set-up by the Senate Permanent Investigating Subcommittee.

Directed the House Government Information Subcommittee to ascertain whether needless service competition had blocked the exchange between services of important research data.

First firm action of the three-pronged probe was taken by the Appropriations unit, which will start a field survey of California missile contractors this week. The study will be shifted to Washington for closed-door hearings on Nov. 20. Defense Secretary Neil McElroy is slated as lead-off witness.

Subcommittee chairman George Mahon (D-Tex.) said a chief aim of the probe will be to try "to ascertain what the situation is and what has been done with millions of dollars appropriated for these (missile) programs." Mahon, a persistent critic of interservice rivalry, indicated investigators would delve deeply into this.

Meanwhile, Senate probers quietly amassed missile data for Armed Services Committee chairman Richard Russell (D-Ga.) and Senate Majority Leader Lyndon Johnson (D-Tex.). Officially, investigators weren't talking, but some spokesmen hinted that preliminary findings were due to be turned over to the Senate leaders, possibly this week.

Missile Week becomes 13th AAP publication

Missile Week, a newsletter especially prepared for top executives and technical management in industry and government concerned with the missile and rocket field, is now being published by AMERICAN AVIATION PUBLICATIONS. Subscription rates are $50 per year, $30 for six months. *Missile Week* is the 15th American Aviation service.

BRIEFS

Military-Manufacturing

The Martin Co. has cancelled $20 million in subcontracts for the Titan ICBM program with Associated Missiles Products Co., subsidiary of American Machine & Foundry Corp. Change in requirements for testing procedures was cited as reason.

"Wag Tail" is the name of the air-to-ground rocket being developed by Minneapolis-Honeywell Regulator Co. for the Air Force. Company's Aeronautical Div. has a $500,000 USAF contract for the project.

Monroe Calculating Machine Co. will merge with Litton Industries through a purchase of the outstanding common stock of Monroe by Litton. Litton recently acquired Maryland Electronic Manufacturing Corp.

Autonetics Div. of North American Aviation has been awarded a $1,760,000 contract from Bureau of Aeronautics for pilot-line production of an advanced airborne magnetic tape recorder for installation in Navy interceptors.

The Royal Australian Air Force is buying 12 Lockheed C-130 Hercules transports for delivery in late 1958. Order is valued at more than $35 million, including spares, crew training and support equipment.

Col. John P. Stapp was awarded the Gorgas Medal by the Association of Military Surgeons during their annual meeting at Washington last week. He was presented the medal for his studies to determine maximum limits of emotional and physical shock that the human body can withstand.

Edwin A. Speakman has resigned as vice president of Fairchild Engine & Airplane Corp. and as general manager of its Guided Missiles Div. He joined Fairchild in 1952. Speakman has served as chairman of the Aircraft Industries Association Guided Missiles Committee.

Chance Vought Aircraft expects to reduce employment by 1,000 before the end of the year. Reduction will be accomplished mostly by normal attrition and by decreasing the number of trainees.

Directors of Savage Arms Corp. have approved a contract to acquire Aircraft Armaments, Inc., subject to approval of Savage stockholders. Joseph V. Falcon, Savage president, said the firms complement each other.

Airtronics International Corp. has been formed in Miami and started production activities Nov. 1 in a 12,000-sq.-ft. plant. Firm will design and manufacture precision gears, plastic injection moldings, die castings, screw machine products and metal stampings. Company will offer electronic and mechanical engineering services.

Cornell University has moved its aviation crash injury research program from Ithaca, N. Y., to Phoenix, Ariz., to be in closer contact with aircraft manufacturers and the Air Force.

Electronic Engineering Co., which designed and developed missile range instrumentation equipment for Patrick Air Force Base Missile Center and Cape Canaveral, has closed its Florida offices and transferred its research & development operations to Santa Ana, Calif., firm's main headquarters.

Transport

Four airlines received contracts for domestic cargo service (Logair) from Air Materiel Command: Resort Airlines, $987,802; Capitol Airways, $820,400; Riddle Airlines, $788,774; AAXICO, $903,095.

Eastern Air Lines has ordered seats from Weber Aircraft Corp. for the 40 Lockheed Electras it has on order.

Robert J. Smith has been re-elected to Continental Air Lines' board of directors. Smith resigned from the board last April when CAB refused to continue its approval of his service with CAL and his position as president of Slick Airways. He resigned the latter post in August.

CAB set June 30, 1959 as the expiration date of American Airlines' new Chicago-Mexico City certificate. The date coincides with the termination date of the provisional U.S.-Mexico air agreement.

New passenger concourse at Atlanta Airport was dedicated recently. The $400,000 facility will be used by Delta, Capital and Southern until Atlanta's $8-million airport terminal building is completed in 1960.

Col. P. I. (Pappy) Gunn, legendary pilot of World War II in the Pacific, and owner of Philippine Air Development Co., Manila, was killed last month when the plane he was flying crashed southwest of Manila.

Financial

Douglas Aircraft Co., Inc. reports net earnings of $24,710,406, equal to $6.67 a share on sales of $828,417,000 during the nine months ended Aug. 31. This compares with $20,596,000, $5.56 a share on sales of $711,286,000 during the same period last year.

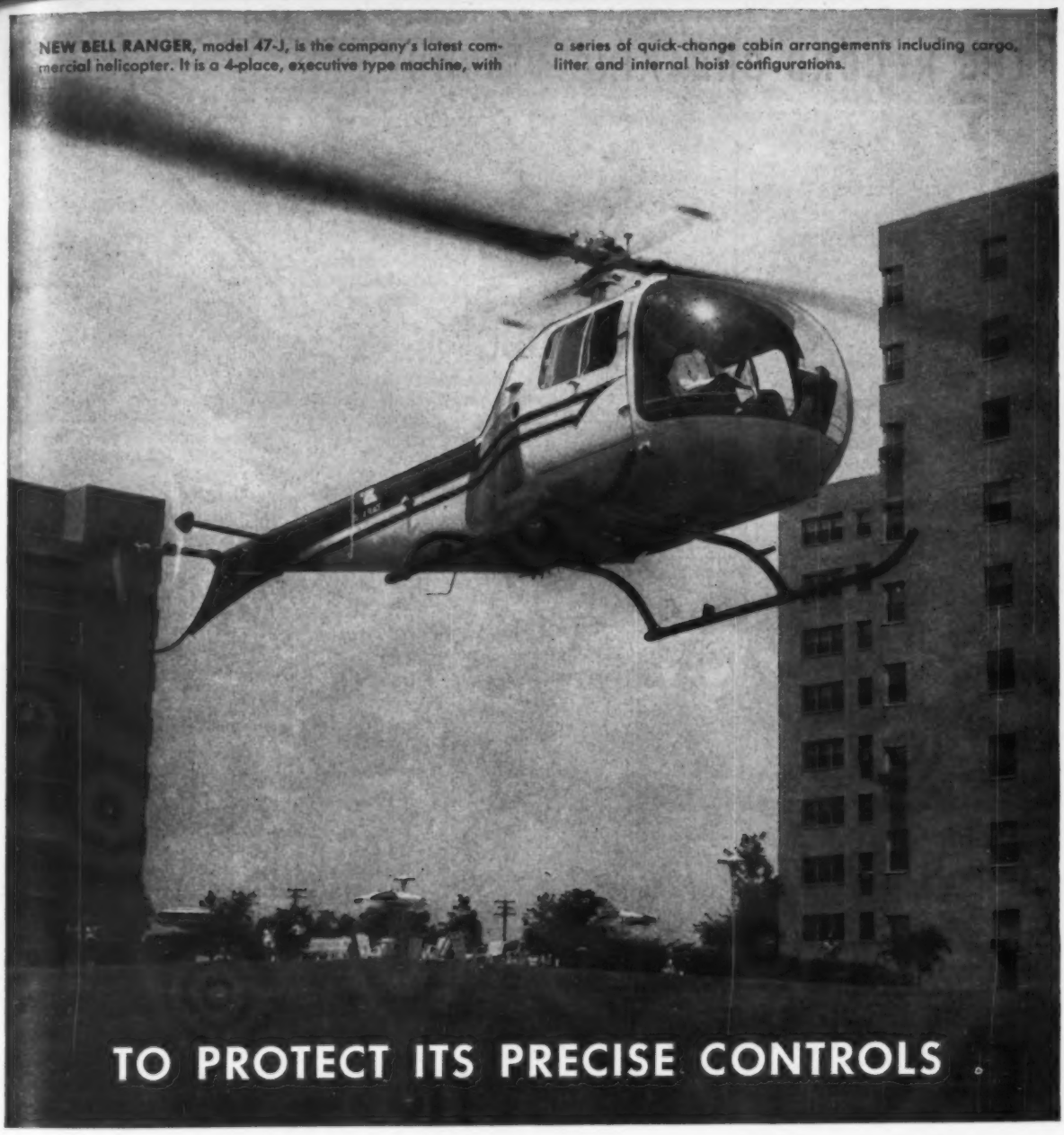
American Airlines' net earnings for the nine months ended Sept. 30 was $10,148,000, equal to $1.23 a share, compared with $17,078,000, or $2.15 a share, for the same period last year. Revenue for the nine months this year was $231,885,000.

United Air Lines' earnings and gains on aircraft sales totaled $7,918,374 for the first nine months of 1957, compared with $11,385,844 in the same 1956 period. Operating revenues were up 7% to a record $214,581,302, but expenses rose 13% to $199,839,924. Passenger-miles were up 8%.

Eastern Air Lines reported net operating profit for the first nine months of this year dropped to $3,306,521 from last year's $8,135,311, despite record operating revenues of $199,791,306. Expenses jumped 27% to $191,610,730.

Eight-place LZ-5 helicopter tours 21 states

DOMAN HELICOPTERS LZ-5 flew a total of 7,000 miles at an average speed of 102 mph in a 21-state demonstration tour. Some 70 companies, including oil firms and helicopter operators, saw the eight-place rotorcraft in action. Powered by a 400-hp Lycoming GSO 580 engine, the LZ-5 features a completely sealed rotor fitting which requires no post-flight maintenance.



NEW BELL RANGER, model 47-J, is the company's latest commercial helicopter. It is a 4-place, executive type machine, with a series of quick-change cabin arrangements including cargo, litter and internal hoist configurations.

TO PROTECT ITS PRECISE CONTROLS

new Bell Ranger relies on Purolator Filters

A hydraulic boost system on the new Bell Ranger takes the fatigue out of piloting this new four-place, executive type machine—and makes its handling precise as well. It operates much like "power steering" on a car. To keep it reliable—through dirt, moisture, or the "cloud" that collects whenever a helicopter takes off or lands—Bell Helicopter Corporation protects their hydraulic boost system with two Purolator filters. That keeps the system clear of dirt and sludge which could otherwise make it falter, or even fail.

There are efficient Purolator filters for aircraft oils, fuel, and air systems as well. It makes no difference at all whether yours is a standard or special application. A Purolator filter will do the best filtration job available anywhere today.

Filtration For Every Known Fluid

PUROLATOR

PRODUCTS, INC.

Rahway, New Jersey and Toronto, Ontario, Canada

SPOTLIGHT

Grumman's OF-1 high performance observation aircraft has passed mockup inspection by Navy and Army. Navy wants the plane for the Marines. Aircraft will be powered by Lycoming T53 turboprops and will have a top speed of 275 knots, minimum of 60 knots. Navy designation is VOF; Army AO. First flight will be in 1959.

Lycoming's new O-320-B high-compression four-cylinder engine that powers the new Piper Apache and Tri-Pacer delivers .57½ hp per pound of engine weight, against .55 hp/lb for its predecessor, the O-320. Engine has an 8.5:1 compression ratio, is 23.12 in. high, 32.24 in. wide, 29.56 in. long.

North American Aviation has received an ARDC contract to design and develop a 600°F electrical actuating system, thus filling out the triumvirate of companies who will manage high-temperature actuating system contracts for USAF. Republic will manage the 1,000°F hydraulic system and Lockheed-Marietta the 1,000°F pneumatic system (AMERICAN AVIATION, July 1, p. 47).

General Mills is in final stages of tooling up for production of its flight recorder, although no orders have been announced. Under a recent Civil Aeronautics Board regulation, airlines must install flight recorders on all aircraft used above 25,000 ft. by next July 15.

Addition of wingtip jets to Convair 340 and 440 aircraft (AMERICAN AVIATION, Sept. 23, p. 25) increases gross takeoff weight by more than 4,000 lbs., but critical takeoff runway length is reduced 20%. The 440 was built for a structural design takeoff weight of 53,200 lbs. in anticipation of increased power. However, it is limited to 49,100 lbs. with reciprocating engines.

Pesco Products is developing a new high energy fuel system for jet engines at its Perry, Ohio, laboratories. System reportedly is for use of Olin Mathieson's HEF-3 in General Electric turbojets. This is first time Pesco has undertaken development of an entire fuel system.

British Decca Navigator System, Inc., is developing a lightweight airborne Decca navaid aimed at private airplane market. Fully-transistorized version will weigh about 15 lbs. without flight log. about 20 lbs. with latter added.

Goodyear Aircraft Corp. is in advanced stages of development of two-place Inflatoplane and expects first flight about Feb. 1. New version will weigh about double that of present model, which Goodyear pegs as equal to that of an "average" man. Four- and five-place versions of rubber airplane also are being considered.

CAA Technical Development Center at Indianapolis is slated to receive two additional Spanrad radar-to-television scan converter systems from Intercontinental Electronics Corp., Mineola, N. Y. Delivery is scheduled before year-end. First Spanrad unit was installed at TDC in February as demonstrator model, but subsequently was purchased from Intec by CAA to speed its evaluation as one possible answer to Air Route Traffic Control center traffic display needs.

Bendix Eclipse-Pioneer Div. has garnered a lion's share of the electronic autopilot market on three of the four big U.S. jet and turboprop transports. Its PB-20D will go into 168 Boeing 707s; PB-20E in 133 Lockheed Electras, and PB-20G in 30 Convair 880s.

Aeronutronics Systems, Inc., a Ford Motor Co. subsidiary, is developing a new air traffic control flight data input system for CAA. Device includes a new typewriter to prepare punched cards for computer use. System will calculate automatically ATA times over check points.

HEAVY HAULING—Big Sikorsky S-56-type helicopters (Army H-37) have demonstrated many uses, carrying troops, supplies, vehicles and weapons. A big H-37, above, carries a heavy Army truck during recent demonstrations for The Army Aviation Board. H-37s are undergoing rigorous field testing at Ft. Rucker, Alabama.

AROUND THE WORLD WITH SIKORSKY HELICOPTERS

TURBINE-POWERED S-58—This turbine-powered Sikorsky S-58 has been flying since the beginning of the year. Built under an experimental Navy program, the test bed is equipped with two General Electric T-58 gas turbines, each rated in excess of 1000 hp. Performance is classified.

SIKORSKYS TO CHILE—With the delivery of four S-55 helicopters, Chile becomes the 23rd nation to operate Sikorsky helicopters. The Chilean Air Force will fly these versatile helicopters in air-sea rescue duty, service in which the S-55 has been conspicuously successful.

HURRICANE WARNING—A day ahead of Hurricane "Audrey," Sikorsky helicopters from the U. S. Coast Guard detachment at New Orleans carried warnings to fishing boats, camps and isolated settlements in the lower Mississippi delta region and around New Orleans. After the hurricane struck the Louisiana coast farther west, the helicopters were assigned to help in the rescue and evacuation work along with Sikorsky helicopters from military services and oil companies. Hundreds of people were flown to safety.

HELICOPTER HISTORY

100,000TH HELICOPTER PASSENGER

On June 15, 1957, Baron Herve de Gruben, *right*, Belgian Ambassador to West Germany, flew from Brussels to Bonn in a Sikorsky S-58 as SABENA's 100,000th helicopter passenger. At his side, *above*, is SABENA's president, M. Willem Deswarte. Not long after, New York Airways flew its 100,000th helicopter passenger. Both lines began scheduled passenger service with Sikorsky S-55s, and have since been equipped with S-58s.

SIKORSKY AIRCRAFT

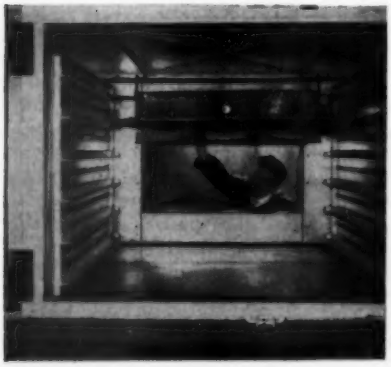
STRATFORD, CONNECTICUT

One of the Divisions of United Aircraft Corporation

New B. F. Goodrich laboratory is proving ground for fuel cells

B. F. Goodrich Aviation Products' new Fuel Cell Development and Testing Laboratory at the big BFG Los Angeles plant is the last word in fuel cell research. Here, engineers maintain constant quality checks on cells being produced for many aircraft including the Lockheed 1049, T-33 and F-104, the Boeing B-52, the Douglas F4D and the Northrop T-38. In addition, fuel cell designs and materials are being developed to meet the requirements of future airplanes still on the drawing boards.

A representative sample of the laboratory's facilities is shown here. Among the specialized types of apparatus are a giant "hot and cold" room, testers for ozone, abrasion and vibration, and many, many more.



FABRIC TEST. B. F. Goodrich technician examines new fuel cell fabric that has undergone a heat aging and pressure test in 700°F. oven.

"SLOSH" TEST. Steel platform rocks 30,000-lb. load through 30° angle to determine capacity of loaded fuel cell to withstand surge pressures.

CONTINUAL INSPECTION. All cell constructions and materials are painstakingly inspected after testing and checked for signs of stress and fatigue.

B.F.Goodrich Aviation Products

a division of The B. F. Goodrich Company, Akron, Ohio

For more details on how BFG is making better fuel cells for today and tomorrow, send for the free booklet, "B. F. Goodrich — Fuel Cell Development and Testing Laboratory."

NOVEMBER 4, 1957—VOL. 21, NO. 12

AMERICAN AVIATION

WORLD'S LARGEST AVIATION PUBLISHERS

Challenge to Big 4 . . .

Regional airlines are slowly chipping away at major trunks' domination of domestic market, AMERICAN AVIATION *survey shows*

by William V. Henzey

THE EIGHT SO-CALLED "regional trunklines" in this country are chipping away slowly at the "Big Four's" domination of the United States air traffic market. But with all trends continuing unchanged, it would take until 1968 for the eight regionals to get a 50-50 split in traffic with the Big Four.

These are general conclusions from an AMERICAN AVIATION traffic study designed to test the initial impact of the Civil Aeronautics Board's 1955-56 route case decisions in which the issue of strengthening the routes of the regional carriers was paramount. The study is based on a comparison of traffic results for the first six months this year against results for the like 1956 period.

Perhaps the most significant development is that involving Capital Airlines, which vaulted into an unchallenged role as the fifth ranking carrier among the trunklines. If Capital's rate of growth continues at the early 1957 pace, it would join the Big Four to form a "Big Five" perhaps by 1962.

Only other carrier showing a

Traffic box score—first six months 1957 vs. 1956

Total Passengers	1957		1956		Change*		% Industry Total	
Carrier	Rank	Passengers	Rank	Passengers	Total	%	1957	1956
EAL	1	3,948,110	2	3,755,775	192,335	5.1	20.1	20.5
AA	2	3,725,161	1	3,773,241	−48,080	−1.3	19.0	20.6
UAL	3	2,977,323	3	3,024,227	−46,904	−1.6	15.2	16.5
TWA	4	2,145,643	4	1,992,769	152,874	7.7	10.9	10.9
CAP	5	1,861,276	5	1,368,829	492,447	35.9	9.5	7.5
DAL	6	1,329,973	6	1,183,987	145,986	12.2	6.8	6.5
BNF	7	984,957	7	896,893	88,064	9.8	5.0	4.9
NAL	8	665,370	8	758,751	−93,381	−12.3	3.4	4.1
WAL	9	646,222	11	314,981	331,241	105.7	3.3	1.7
NWA	10	634,795	9	640,677	−5,882	−1.1	3.2	3.5
CAL	11	385,191	10	340,201	44,990	13.2	2.0	1.9
NEA	12	295,166	12	250,808	44,358	17.5	1.5	1.4
Total	..	19,599,187	..	18,301,139	1,298,048	7.1	..	..
Big "4"	..	12,796,237	..	12,546,012	250,225	2.0	65.3	68.6
Others	..	6,802,950	..	5,755,127	1,047,823	18.2	34.7	31.4

Total Ton-miles	1957		1956		Change*		% Industry Total	
Carrier	Rank	Ton-miles	Rank	Ton-miles	Total	%	1957	1956
AA	1	293,816,527	1	268,167,149	25,649,378	9.6	22.1	22.7
UAL	2	251,961,607	2	237,064,567	14,897,040	6.3	19.0	20.0
EAL	3	241,748,162	3	222,556,661	19,191,501	8.6	18.2	18.8
TWA	4	182,628,121	4	165,575,599	17,052,522	10.3	13.8	14.0
CAP	5	72,945,830	8	47,397,970	25,547,860	53.9	5.5	4.0
DAL	6	71,501,049	6	61,429,802	10,071,247	16.4	5.4	5.2
NAL	7	58,509,332	5	61,645,307	−3,135,975	−5.1	4.4	5.2
NWA	8	49,392,724	7	47,688,385	1,704,339	3.6	3.7	4.0
BNF	9	44,957,062	9	37,603,381	7,353,681	19.6	3.4	3.2
WAL	10	33,806,925	10	16,079,643	17,727,282	110.2	2.6	1.4
CAL	11	16,098,509	11	12,987,748	3,110,761	24.0	1.2	1.1
NEA	12	7,989,417	12	4,913,036	3,076,381	62.6	.6	.4
Total	..	1,325,355,265	..	1,183,109,248	142,246,017	12.0	..	..
Big "4"	..	970,154,417	..	893,363,976	76,790,441	8.6	73.2	75.5
Others	..	355,200,848	..	289,745,272	65,455,576	22.6	26.8	24.5

** All figures represent increases unless otherwise indicated.*

NOTES: Eastern figures include Colonial traffic for first time.
Western's increase inflated because 1956 figures cover period of strike.

growth rate as great, percentage-wise, as Capital, is Northeast Airlines. But NEA's total business growth was only one-tenth that of Capital's and it still ranks last among the 12 trunks.

Meanwhile, the overall industry picture is this: The Big Four got 74.7% of the total traffic (revenue passenger miles) a year ago. This year, they increased their capacity by 15%, but realized a traffic increase of only 9.8%. Result, their hold on the total market dropped to 72.2%.

Here is the picture from the other side. The eight regionals got 25.3% of the total market a year ago. They upped their capacity 33.6% this year and realized a 27.8% gain in business. As a result, the regionals this year got 27.8% of the market.

In short, the Big Four is holding on to the share of the market they had a year ago, but the regionals are getting almost 50% of the increased business.

Meanwhile, here is a carrier-by-carrier analysis based on this special study:

American Airlines: Still the leader traffic-wise but second to Eastern Air Lines in terms of capacity offered and total passengers carried. AA increased its capacity by 14.9% but saw its portion of total industry capacity decline from 20.5% to 19.6%. Total passengers off 1.3% but revenue passenger-miles up 8.3%. In terms of capacity, passengers, passenger-miles and traffic generally, AA's rate of increase was below the industry average.

Eastern Airlines: First in capacity offered and total passengers carried, second in revenue passenger-miles and third in total ton-miles of traffic. Added most new seat-miles in industry, 740,863,000, for a 23.8% increase. Revenue passenger-miles were up 15.9%. But EAL's portion of total industry traffic dropped from 18.8% in 1956 to 18.2% this year.

United Air Lines: Most conservative in industry in terms of added capacity with an 8.9% increase as compared with industry average of 19.8%. Revenue passenger-miles up 5.3% and percentage of industry total down from 19.4% to 18%. United generally ranks third behind AA and Eastern except in total ton-miles of traffic where it is a solid second to American.

Trans World Airlines: Ranks fourth in the Big Four in all categories of the study, but it showed greater percentage gains than both American and United in terms of added traffic. In terms of passenger-miles, TWA's share of the total industry market dropped from 14.3% to 13.9%.

Capital Airlines: Made industry's most substantial strides to gain top-ranking spot among the regional carriers. Its addition of 464,426,000 seat-miles was exceeded only by Eastern's (740,863,000) and American's (488,592,000). Now fifth in the industry in capacity offered, Capital was 7th a year ago. CAP's gain of 492,447 passengers was far in excess of the Big Four total of 250,225 and raised CAP's percentage of the total passenger market from 7.5% to 9.5%.

Delta Air Lines: Sixth-ranking carrier in all categories studied. It increased its capacity by 25.2% and realized a traffic gain of 18.1%. Delta's percentage of the total revenue passenger-mile market increased slightly from 5.4% to 5.6%.

National Airlines: Only one of the trunks showing a drop-off in revenue passenger-miles, total passengers, and ton-miles of traffic. NAL dropped from 6th to 7th in passenger-miles and 5th to 7th in total ton-miles of traffic. NAL upped its capacity 13.6% but passenger-miles were down 1.2%. NAL's portion of the total industry passenger-mile market dropped from 5.3% to 4.6%.

Northwest Airlines: Eighth-ranked carrier except in total passengers where it ranks 10th. Increased capacity by 11.6% but revenue passenger-miles were up only 4.9%. NWA's portion of total passenger-mile market declined

Revenue passenger-miles

Carrier	1957 Rank	1957 Total (000)	1956 Rank	1956 Total (000)	Change* Total (000)	Change* %	% Industry Total 1957	% Industry Total 1956
AA	1	2,486,633	1	2,296,301	190,332	8.3	20.8	21.8
EAL	2	2,335,195	3	2,014,526	320,669	15.9	19.5	19.1
UAL	3	2,156,527	2	2,047,557	108,970	5.3	18.0	19.4
TWA	4	1,664,197	4	1,511,378	152,819	10.1	13.9	14.3
CAP	5	708,650	7	451,696	256,954	56.9	5.9	4.3
DAL	6	672,105	5	569,172	102,933	18.1	5.6	5.4
NAL	7	549,562	6	555,876	−6,314	−1.2	4.6	5.3
NWA	8	431,952	8	411,635	20,317	4.9	3.6	3.9
BNF	9	420,988	9	352,465	68,523	19.4	3.5	3.3
WAL	10	318,891	10	152,371	166,520	109.3	2.7	1.4
CAL	11	153,625	11	123,093	30,532	24.8	1.3	1.2
NEA	12	78,688	12	50,438	28,250	56.0	0.7	0.5
Total	..	11,977,013	..	10,536,508	1,440,505	13.7	..	..
Big "4"	..	8,642,552	..	7,869,762	772,790	9.8	72.2	74.7
Others	..	3,334,461	..	2,666,746	667,715	25.0	27.8	25.3

Available seat-miles

Carrier	1957 Rank	1957 Seat-miles (000)	1956 Rank	1956 Seat-miles (000)	Change* Total (000)	Change* %	% Industry Total 1957	% Industry Total 1956
EAL	1	3,860,810	2	3,119,947	740,863	23.8	20.1	19.5
AA	2	3,767,188	1	3,278,596	488,592	14.9	19.6	20.5
UAL	3	3,362,747	3	3,087,839	274,908	8.9	17.5	19.3
TWA	4	2,623,677	4	2,356,005	267,672	11.3	13.7	14.7
CAP	5	1,196,180	7	731,754	464,426	63.4	6.2	4.6
DAL	6	1,098,545	5	877,385	221,160	25.2	5.7	5.5
NAL	7	885,309	6	779,339	105,970	13.6	4.6	4.9
NWA	8	760,211	8	680,895	79,316	11.6	4.0	4.2
BNF	9	711,395	9	563,971	147,424	26.1	3.7	3.5
WAL	10	506,494	10	239,468	267,026	72.7	2.6	1.5
CAL	11	279,417	11	232,781	46,636	19.7	1.5	1.5
NEA	12	163,892	12	85,835	78,057	90.7	.9	.5
Total	..	19,215,865	..	16,033,815	3,182,050	19.8	..	..
Big "4"	..	13,614,422	..	11,842,387	1,772,035	15.0	70.8	73.9
Others	..	5,601,443	..	4,191,428	1,410,015	33.6	29.1	26.1

from 3.9% to 3.6%.

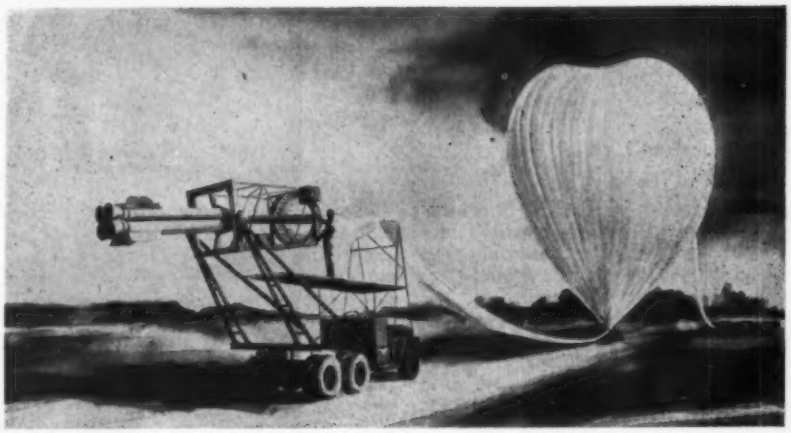
Braniff Airways: Ninth-ranked carrier except in total passengers where it ranks seventh. Braniff upped capacity 26.1% and realized a 19.4% gain in revenue passenger-miles. Its growth rate, like Delta's, exceeded the industry average, but was lower than that of the regionals generally. Braniff's share of the total passenger-mile market increased slightly from 3.3% to 3.5%.

Western Air Lines: Generally the 10th ranked carrier but Western is the only one for which this study is not appropriate. Reason is that WAL had a strike during much of the 1956 period and the growth percentages shown are thus distorted.

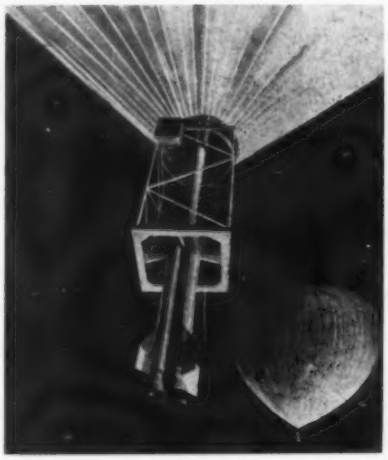
Continental Air Lines: Eleventh in ranking but it will take another year to get a line on the effect of CAL's new route awards, particularly the Chicago-Los Angeles route which was activated this spring. Carrier's rate of growth is above industry average but it would have to double its traffic to equal that of the 10th ranked carrier, Western.

Northeast Airlines: Substantial growth percentage-wise, but still the lowest-ranked carrier among the trunks. NEA's capacity increase of 90.7% was far in excess of the industry average of 19.8% and the regionals' average of 33.6%. Perhaps significantly, NEA's total ton-miles of traffic increased in an amount virtually equivalent to the decrease in National's total.

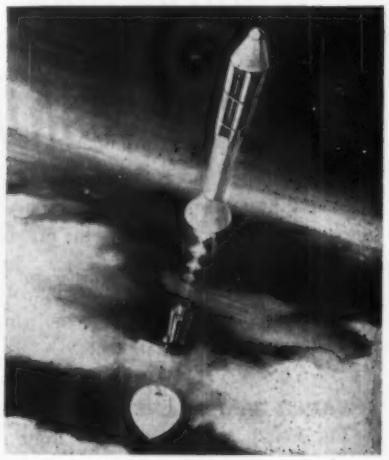
How 'Far Side' launched rockets



FOUR-STAGE space probe shown mounted on specially built trailer-truck.



ROCKET TRAJECTORY is directed through the giant polyethylene balloon.



MAXIMUM ACCELERATION of 200 Gs can be reached within the 26 seconds of powered flight.

A BALLOON-LAUNCHED rocket soared more than 4,000 miles above the earth on Oct. 21, and the Air Force emerged victorious in its "Far Side" project, which had seen four successive failures, on Sept. 25, Oct. 3, 7 and 11. (AMERICAN AVIATION, July 29, pp. 34 and 56.)

Scientists in charge said that rocket's radio signal faded eight minutes after firing, returned 75 minutes later. AF Col. E. C. Lavier said that this delay meant that top altitude exceeded the 4,000-mile figure.

In the test, a giant polyethylene balloon ascended to 96,500 feet with a 1,900-pound four-stage rocket. Purpose was to gather data on cosmic rays, magnetic fields and other high-altitude phenomena.

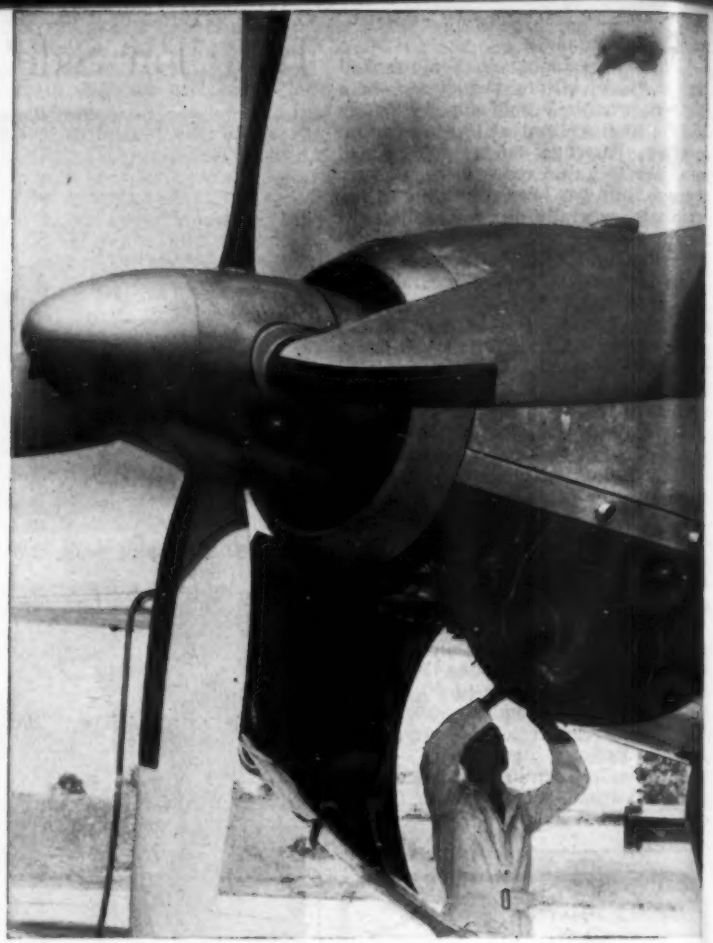
Vehicle's first stage comprised a cluster of four Thiokol Recruit engines; second stage, a single Recruit; third stage, a cluster of four Grand Central Arrow II rockets; and last stage, an Arrow II rocket capped by a 3½-pound instrument package.

First test flight of the balloon, which was developed by General Mills for prime contractor Aeronutronic Systems, Inc., occurred June 28 at a flight test center near New Brighton, Minn. At this time, the balloon rose above 104,000 feet with a load comprising a dummy vehicle and the associated launching platform.

After reaching an altitude of 65,000 feet over Hammond, Wis., about 40 miles east of the launching site, the balloon continued to ascend to 106,000 feet while moving in a westerly direction.

Five-and-a-half hours after balloon launching, all of the equipment used in the experiment was automatically released from the sky hook and was parachuted to the ground.

When fully inflated with helium, the balloon has a volume of 3,750,000 cubic feet and weighs 1,500 pounds. Gross weight of the balloon plus equipment, almost two tons, is the heaviest load ever carried above 100,000 feet, according to the Air Force Office of Scientific Research (Air Research and Development Command).



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While the final decision depends on a number of variables—such as the life of the aircraft, its book value and its revenue earning power—it is almost always sounder economics to convert an existing piston engined machine than to buy a new airliner. An Eland conversion can be carried out for less than a third of the cost of a new aircraft with the certainty that this expenditure will be quickly recovered by the increased earning power.

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CAB continues to defy Congressional probers

by Charles Schaeffer

WHAT MAY BE the most explosive civil investigation of the 85th Congress has been launched, with the Civil Aeronautics Board as its target. Claiming indisputable legal authority, the Moulder House Subcommittee publicly and privately has demanded 100% access to the most confidential Board files.

In defense of their asserted right to protect personal data from outside eyes, however, Board members have steadfastly refused to surrender unconditionally to investigators. The stubborn CAB stand stopped the probe in its tracks.

When investigators publicly fumed, Chairman James Durfee relented slightly, agreed to tone down a controversial staff memo on how to handle Congressional queries, but slammed the drawer tighter on possibly touchy personal records.

As the public clamor subsided, investigators, brandishing impressive-looking legal precedents, resumed a steady drumfire behind the scenes. The more the Board bridled, the more Moulder staffmen persisted. In the end they trained their sights on the 1% CAB had chosen to withhold, rather than the 99% of the record it had agreed to release.

All agencies under scrutiny

Eventually, when the smoke clears, veteran observers were predicting, chief counsel Dr. Bernard Schwartz would stand victorious. Nothing, presumably, could block the heavily financed subcommittee from plunging ahead with its task—a full-scale probe of all regulatory agencies. Rep. Morgan Moulder (D-Mo.) heads the subcommittee.

Whatever else might be said of the initial tactics of the Special Subcommittee on Legislative Oversight, it had been handed remarkably comprehensive guidelines. The key to the subcommittee's aims turned up in a confidential staff directive, the details of which are disclosed here for the first time. Through the directive runs the theme of the investigation: Are regulatory agencies drifting away from the Congress that created them?

In the lengthy document, it is made clear that the Moulder investigators have been ordered to construct perhaps the most telling profile yet of the agencies. Nearly every phase of work-a-day operations, from the minutest details of certain cases to a run-down on a Member's typical day, is prescribed.

Significantly, investigators are called upon to evaluate and produce answers that could conceivably have wide effects. But mingled with penetrating specifics are curiously academic questions—for which the answers seem obvious, or, at least, readily obtainable without investigation.

Yet the parts pieced together could form a fascinating whole. What the questionnaire, minus the answers, appears to add up to is the framework for a graphic display of the growth and changing spheres of influence of agencies over the years.

For example, it asks probers to describe:

The statutory duties, organization, general procedures and work-load of the agency.

The methods of the agency and staff in policy formation, internal administration, rule-making and adjudication.

The relations of the agency with the President and executive officials.

The relations of the agency with the regulated industry and the public.

The extent to which the agency has fallen down on the job of following Congressional intent.

Apparent in the directive is the unit's resolve to do more than a contemporary study. Where material cannot be obtained since the agency's birth, staffers have been told to hark back as far as Jan. 1935. Here they will ask for: names of commissioners; dates of appointment and the Presidents who made the appointment; geographical distribution; educational and occupational backgrounds; prior public service; age at time of appointment and jobs after leaving the agency.

A list of all staff members since 1946, size of appropriations, and a comparison of these over the past decade is asked. The subcommittee wants also to uncover the number and reasons for any Presidential firings; and investigators are flatly asked to determine if there has been stepped-up Presidential pressure on members in the waning days of their terms.

The concern with potential White House domination of the regulatory agencies revolves around the chairmen. Investigators want to determine, by illustration, whether independence is dwindling in the face of implied Presidential influence. And staffmen are asked this poser: "Should Presidential appointment be abolished?"

Moreover, the subcommittee wants a record of all Presidential communications during the past five years—and instances in which a word from the Chief Executive may have swayed pending cases.

Inherent in the subcommittee survey is the question of whether or not the regulators are being regulated by the regulatees. "What industry representatives are in fairly constant liaison with the agency?" asks the subcommittee. "What are their functions?"

The names of lobbyists are called for, and the implication is strong in the unit's demand for a list of all gifts from industry that things at the various agencies are not as simon-pure as they might be.

Leeway is left, however, for the agency which survives such an acid test; for investigators are urged to "evaluate the success of the agency in maintaining its independence from the regulated industry."

Far-reaching task

The task the subcommittee has set for itself is far-reaching. Heads of agencies are bound to resist. Traditionally, most have come to consider themselves custodians of confidential records. The executive prerogative to withhold certain information and the quasi-judicial nature of their work will form the basis of their arguments.

Whether it holds up remains to be seen. The subcommittee is powerfully backed by Speaker Sam Rayburn; it has money, $250,000, probably the largest allotment ever handed a special House subcommittee.

Presently, blunt-speaking Bernard Schwartz, New York University professor, and a well-known legal authority, is actively composing impressive arguments why Congress has a legal right to unimpeded access of agency files. The essence of his "Memorandum of Law" released during a recent public hearing is: the "executive privilege" to withhold data from the legislative cannot apply to the CAB, which is outside the executive; and, further, there is no legal justification for the stand taken by the executive itself.

At immediate issue, of course, is the status of the personal written exchanges between Board members. The ultimate answer may lie in a court decision. But in the meantime the clash of opposing views on Congressional rights will become an increasing source of interest. In the end, at least as many lawmakers hope, the regulatory agencies may swing out from the White House shadow and back into the Congressional orbit.

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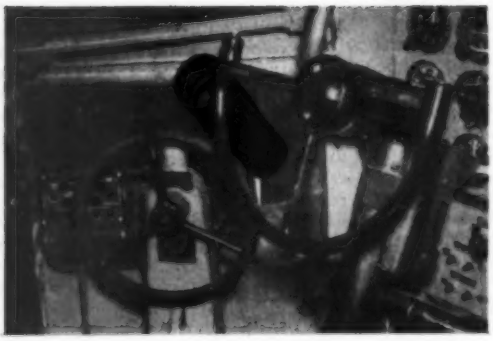
Pan American World Airways has ordered Edo Loran units for installation in its fleet of Boeing and Douglas jet transports. Selection of the new Edo long-range navigation equipment followed testing in both Atlantic and Pacific service. Edo Loran drew praise from pilots and technical personnel alike for its simplicity of operation, accuracy and reliability. Edo's lightweight (29 pounds), compact design for cockpit installation, simple operation and directly-read data for pilot use, combined with the accuracy and proven reliability of the Loran system, were factors in Pan Am's choice of Edo Loran as the basic long-range navigation system for its upcoming fleet of jet aircraft.



Installation of Edo Loran in Pan American Boeing Stratocruiser shows compact design and convenient mounting for pilot operation. ¾ ATR receiver unit is remotely installed.

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To attract capital, airlines must prove earning power

by Selig Altschul

THERE IS NO SUBSTITUTE for solid earning power in attracting capital to the airline industry in a free enterprise system. This truism is being currently revealed in the almost desperate attempts by the domestic trunk airlines in seeking capital for existing and contemplated equipment acquisition programs. It is a condition that will become more evident for the local service operators as they persist in their almost never-ending quest for funds.

For the local service carriers, the shock may be particularly acute as they were led to anticipate great things from the enactment, at the last session of Congress, of two pieces of legislation intended for their benefit by their respective sponsors. These were the so-called Equipment Trust Bill and the government-guaranteed loan measure (AMERICAN AVIATION, Sept. 23, 1957, p. 53). Ironically, a third bill, dealing with capital gains, when and if enacted, will be far more beneficial in helping the airlines with their finances.

The Equipment Trust Bill, while a desirable piece of legislation, is at best only an incidental device that may at some future point be helpful in the financial processes of the airlines. *It will most definitely not attract capital, in itself, to the industry at this time or in the near future.*

Equipment trust certificate financing has been most successful in the railroad field. In fact, since World War II, it is estimated that between $400 and $500 million annually have been raised by the railroads in the form of trust certificates to help finance the acquisition of railroad cars and locomotives. Equipment trust paper has unquestionably facilitated greater ease and simplicity for the railroads in rolling stock acquisitions.

The principle of "pay-as-you-go" which underlies this type of paper is time-tested and has survived numerous crises in railroad reorganizations. The fact that it has held up very well has made the equipment trust an attractive instrument even in times when railroad credit was at low ebb. Secured by the actual rolling stock, the equipment trust has survived many financial difficulties.

The air transport industry has, until most recently, been denied access to this financing paper. At one time, an equipment trust trustee could be held liable as owner of the aircraft if it were involved in an accident. Further, there was no satisfactory method of recording interests in engines and spare parts.

Largely as a result of recommendations advanced by the Congressional Aviation Policy Board in 1948, both of these legal obstacles were removed by Congress some time ago.

More formidable was the classification of the legal question of ownership of mortgaged airline property in bankruptcy. Under previous conditions, a secured creditor could not legally repossess operating property immediately.

While the Congressional Aviation Policy Board also recommended to Congress that necessary corrective provisions be enacted, this was not done until this year. This involved an amendment to Chapter 10 of the Bankruptcy Act and provides that the lender's right to take possession of the equipment (securing the paper) shall be exempt from the other provisions of this Act. This exemption is the same previously made applicable to the railroads.

The airlines now have a clear legal access to equipment trust financing. Yet to be accomplished is the establishment of "constructive ownership" of the planes securing the equipment trust paper in CAB rate proceedings. However, it is generally anticipated that this specific element can be readily resolved.

More formidable insofar as the implementation of equipment trust financing for the airlines is concerned are the economic facts of life for the industry. It is a mistake of major magnitude to assume that because equipment trust financing is successful in the railroad field it will automatically have the same result for the airlines, particularly for local carriers.

From the standpoint of capitalization, assets, gross revenues, operating income and the ability to generate earnings for interest payments and debt amortization, the airlines are infants in relation to the railroads. For example, at the 1955 year-end (latest available but not appreciably changed by 1956 results) U.S. railroads, could boast a total net investment of more than $26.8 billion in road and equipment, materials and supplies, including cash as well. Equipment represented less than 40% of this total investment. This was supported by $15.2 billion in net capitalization, or less than 50% of total investment in road and equipment.

Of this capital structure, about $8.4 billion or 55% was represented by funded debt. Of the funded debt, $2.5 billion or 30% was represented by equipment trust obligations. All this was supported by total gross revenues of more than $10.5 billion and in excess of $1.1 billion of net railway operating income. This net operating income was available to pay fixed charges such as interest and rentals for leased lines.

Interest on equipment trust paper generally has a prior claim over all other debt. Nevertheless, it is evident that even on an over-all basis (and assuming a liberal average 4% rate on the trust paper) interest on all debt was covered more than eleven times.

The financial condition of the local service airlines is startling in contrast. Total assets of the group at the 1956 year-end aggregated $37.9 million. Of this total, $20 million (net) was represented by property and equipment. However, flight equipment alone generally runs around 90% of this total.

In other words, flight equipment predominated in an overwhelming manner among airline assets and does not have substantial related investments as is found in the railroads.

The local service airline's industry net capitalization amounted to slightly more than $19 million or 95% of the group's net property investment. Of the capital structure, $7.8 million was represented by long-term debt. However, because of the industry's serious difficulty in attracting capital, it has been forced to resort to short-term financing through its current liabilities.

Most significantly, with very few exceptions, the local service airlines have pledged their equipment under existing loans either directly or indirectly. Moreover, in most instances, future equipment acquisitions are subject to the terms of prevailing credit agreements. With few other assets available to an airline, it is unlikely that present creditors would be inclined to subordinate their claims in favor of new obligations to be created by equipment trust paper.

Of more immediate consequence is the CAB-sponsored measure for government-guaranteed loans for the local service airlines. Under the measure, up to $5 million per airline and 90% of the total loan can by guaranteed by the government in the acquisition of new or approved aircraft. While this is a great help, the airlines availing themselves of this measure still have the problem of obtaining additional capital from other sources. This includes the remaining 10% or up to $500,000 of the maximum plus working capital for indoctrination, integration, sales promotion and other related expenses.

Pentagon Profile

Malcolm A. MacIntyre, Under Secretary of the Air Force

AS THE USAF procurement crisis—worst in history—was gaining its first momentum last June, Malcolm A. MacIntyre stepped into the No. 2 spot in the Air Force hierarchy.

In his short tenure, he has become the virtual titular leader of almost desperate Pentagon attempts to telescope Air Force programs to fit under the too-quickly lowered spending ceiling.

His immediate role, apparently assigned by Air Force Secretary James Douglas, has been to oversee Air Force-industry efforts to bring program estimates down to meet money availability.

MacIntyre sees the underlying question of his assignment as: "How much have programs been underpriced? If not underpriced, has spending been faster on the programs than estimated?"

His philosophy toward the critical dilemmas is acknowledgment of the inevitability of the White House-imposed spending ceiling.

"Readjustment might have come later," he observed to AMERICAN AVIATION, "but it had to come sooner or later."

He makes no secret of the fact—supported by many—that a more gradual leveling-off would be healthier. But, he maintains, the present debt ceiling just will not permit such a course.

Who is this man playing such a vital role in both contractor and military problem areas?

MacIntyre is new to government service, deemed in many quarters to be an advantage. He is an attorney by training and trade. He served with the Air Transport Command during the war, wearing the eagles of an Air Force officer. He later was general counsel for American Airlines, where he acquired a working knowledge of the complexities of financing aircraft procurement. He was a member of the law firm of Debevoise, Plimpton and McClain of New York.

MacIntyre has educated himself surprisingly well on the present Air Force fiscal situation in a relatively short span of time. His quick grasp of the problems was mandatory, since there was no time for slow orientation. Emergency action has been the rule since he took office.

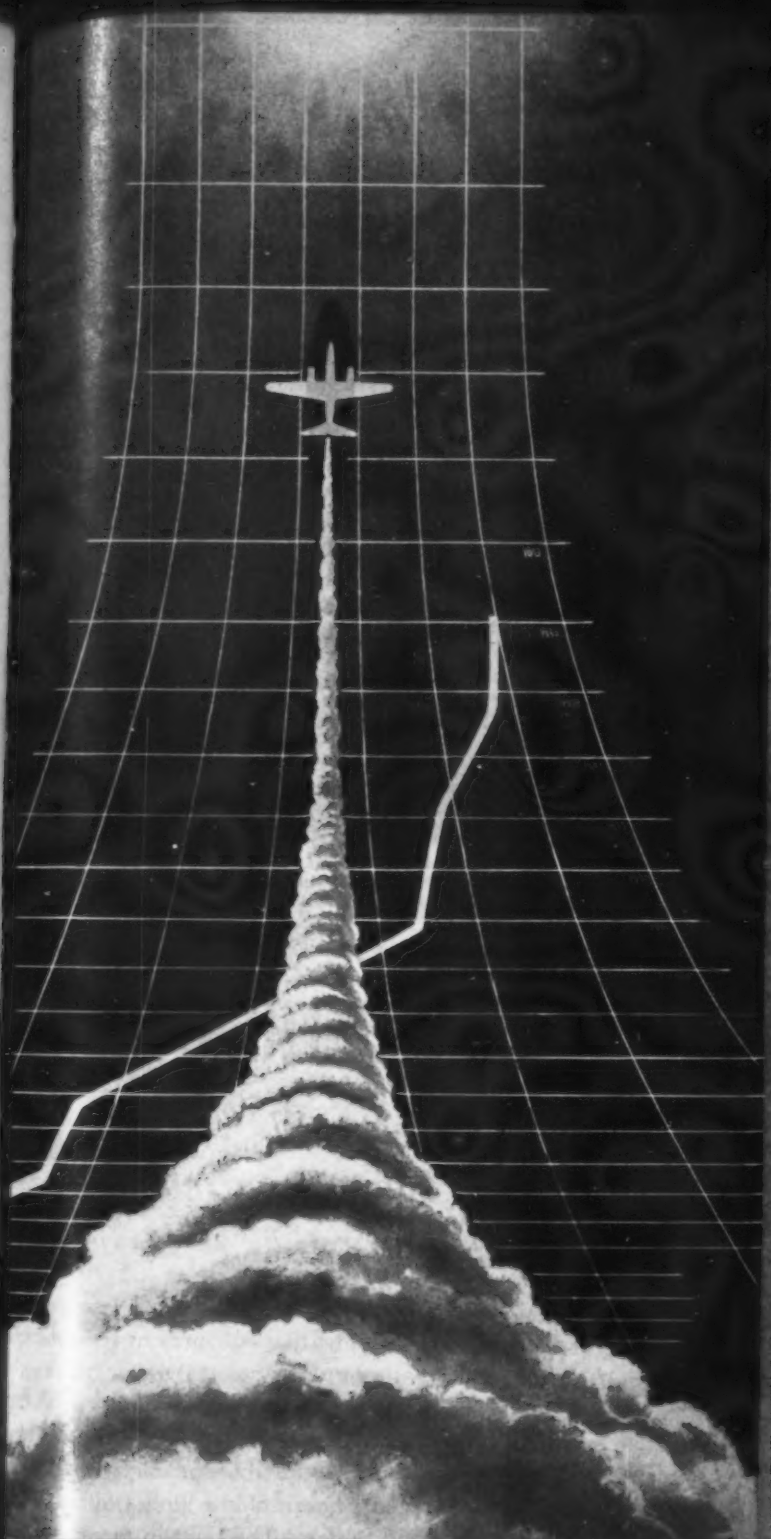
Poised and articulate, MacIntyre is a practical man, not a crusader. He has appraised the situation from the standpoint of the ground rules established by the Administration. His every effort is now focused on working out the best possible compromise within existing conditions. His is a step-by-step approach, based on an awareness that the present situation is not good but that the money shortage, debt ceiling, and level-off time are realities and the big job *now* is to work out details to meet them.

Effects of the spending level-off, he declared, is to accelerate basic decisions on concepts of missile selection for further development and production, while taking a closer look at the timing of the manned aircraft-missile mix. The key to the problem of continuing vital manned system modernization while building up missiles is *planning*, he observed. He knows it's difficult and expensive, but appears optimistic that it can be done.

His full-time efforts are now devoted to bringing the procurement program under spending control, at least until the money situation changes. If and when his "fireman" duties reach a conclusion, he will take on other areas as Douglas' chief deputy.—L.C.P.

"Readjustment might have come later . . .

"But it had to come—sooner or later!"



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FOR STORM AVOIDANCE: This is a typical storm as it appears on pilot's indicator. The dark holes indicate areas of high turbulence. Thus warned, pilot can select a safe, comfortable flight path through or around storm area.

FIRST "150-MILE" WEATHER RADAR TH

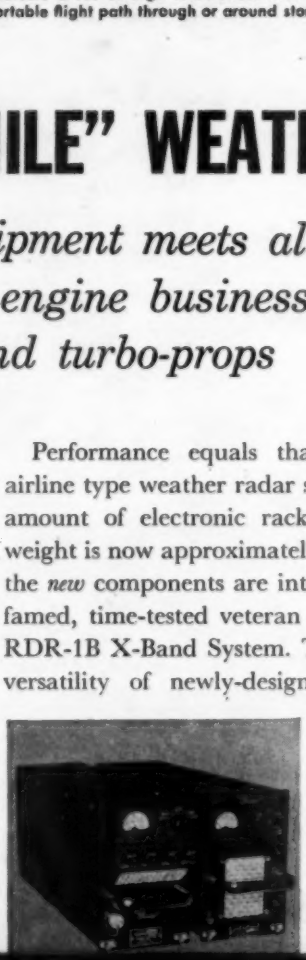
New Bendix equipment meets all requirements—from twin engine business aircraft to latest jets and turbo-props*

Jet age requirements for more compact, lighter weight equipment of airline calibre have inspired some impressive improvements in aircraft accessories design. And far out front in the vanguard of these improvements you'll find Bendix' *new* 150-mile-range weather radar system . . . the RDR-1D. Substantial weight and size reductions, without impairment of quality or performance, now enable Bendix to offer this airline type weather detection radar equipment to a much wider variety of business and commercial aircraft.

Performance equals that of present commerci In ad airline type weather radar systems requiring twice th wea amount of electronic rack space. The total syste ound weight is now approximately 85 pounds. What's mor For c the *new* components are interchangeable with Bendi ite to famed, time-tested veteran of the global airways, th oduct RDR-1B X-Band System. The built-in flexibility an 500 M versatility of newly-designed components make ndix possible to "customize ork 17, Bendix Weather Rada mited,

RDR-1D Transmitter-Receiver
SYN-1B Synchronizer-Power Supply

New RDR-1D Transmitter-Receiver weighs only 26 pounds . . . Synchronizer-Power Supply only 21 pounds. Total rack space for complete system is only 1-ATR.



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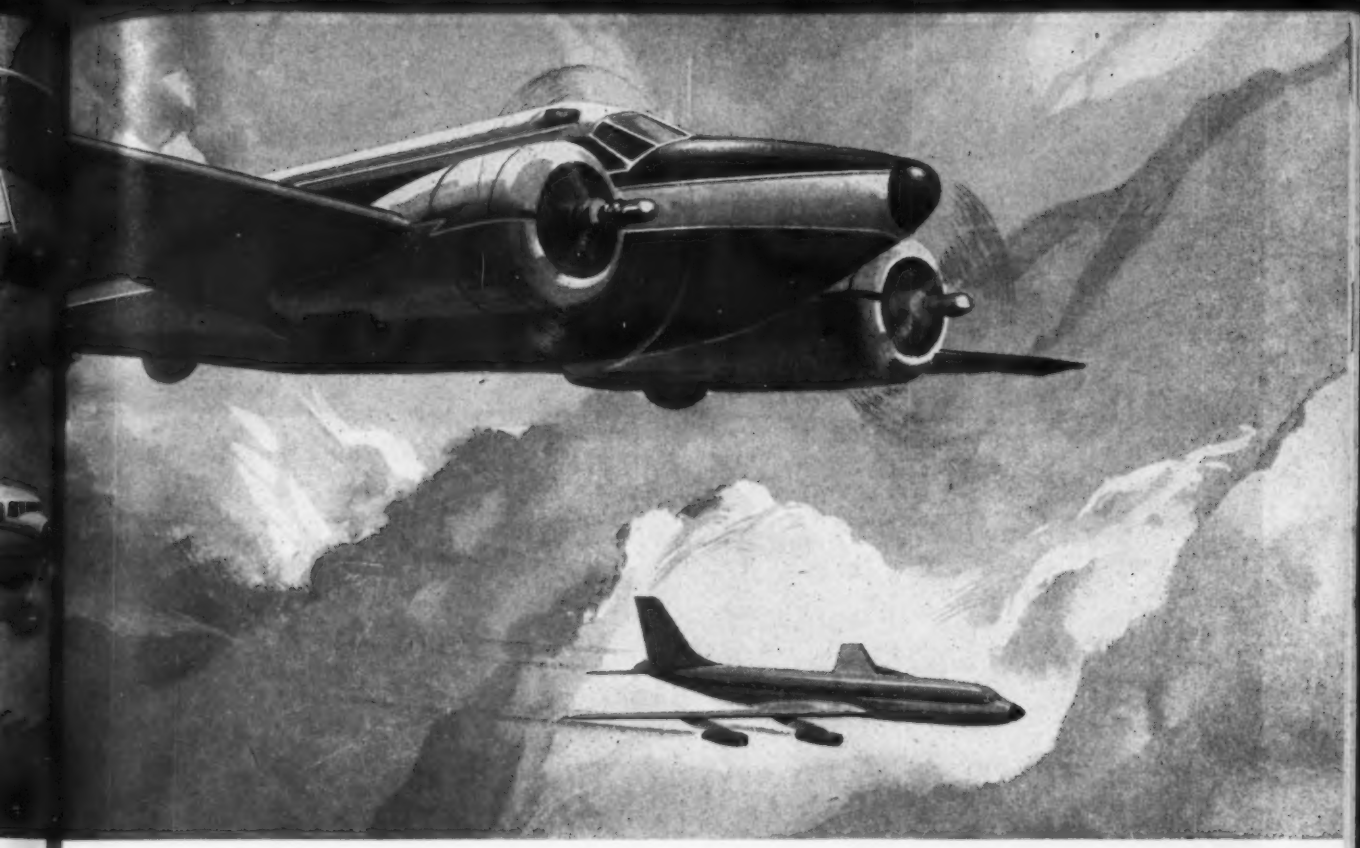
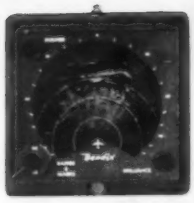
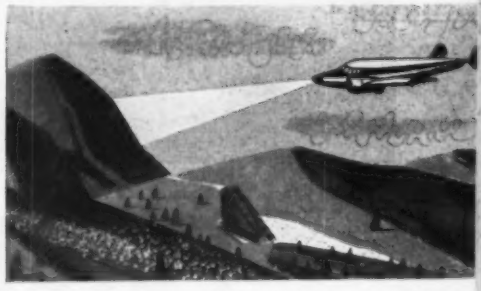


DAR THAT FITS ALL THREE!

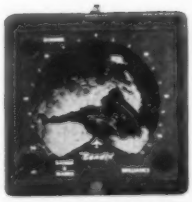




FOR TERRAIN AVOIDANCE: A means for detecting high terrain in flight path is an additional feature of Bendix Weather Radar. This is particularly valuable under emergency conditions due to instrument failure, or when off course. Indicator at left shows mountain ridges in flight path, gives pilot ample time to take avoidance action.

fit practically any type of aircraft on the market. For aircraft lacking sufficient space for the larger - and 30-inch "dish" type radar antennas, new - and 18-inch sector scanning antennas especially signed for limited configurations will be available. In addition to its primary function, this new RDR- weather radar matches its famous counterpart for ound mapping and terrain avoidance.

For complete information and performance data, ite to Bendix Radio Division, Aviation Electronic oducts, Baltimore 4, Maryland. Or West Coast— 500 Magnolia Blvd., N. Hollywood, Calif.; Export— ndix International Division, 205 E. 42nd St., New ork 17, N.Y. Canada—Computing Devices of Canada mited, P.O. Box 508, Ottawa 4, Ontario.



FOR GROUND MAPPING: By tilting antenna downward, pilot can see outstanding terrain features, such as cities, mountains, rivers, lakes, etc. Area scanned depends on altitude and degree of antenna tilt. Pilot can orient his position accurately at night or under conditions of limited visibility by reference to known landmarks.

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Photo courtesy SPS

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Silvium alloy grid after corrosion test

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**U.S. Patent*

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New additive promises 20% boost in engine power

by William O'Donnell

WHILE IT IS TOO EARLY to give many details of preliminary testing of Ethyl Corp.'s AK-33X gasoline additive, it is estimated that about two years will be needed before it is sufficiently developed for use in internal combustion engines, according to representatives of Wright Aeronautical Div. and Imperial Oil, Ltd. at the 1957 Champion Aircraft Spark Plug and Ignition Conference.

WAD has revealed that its sales department has proposed a new R3350 Turbo Compound engine and modifications on existing R3350s to use fuels with the additive. Use of AK-33X is said to give much greater power—as much as 20%.

Although L. C. Smith of WAD said the company was not in a position to disclose full details, he did indicate that a fouling problem has been encountered in the use of the additive. This is the result of deposits on spark plugs, Smith said. He added that the right concentration of the additive may not have been found.

VAPOR BLAST MODEL 530 spark plug cleaner designed for small airlines' use.

Smith said that high-frequency ignition systems may be the answer to the fouling problem. The HF system is capable of firing plugs that present ignition systems cannot. Testing of a high frequency system (developed by Bendix Scintilla Div., AMERICAN AVIATION, Sept. 23) is beginning on a full-scale basis this month and results of the tests will be released as obtained.

Ethyl Corp. agreed with Imperial that two years will be needed before the additive is ready for commercial use. This is based on past experience, Ethyl revealed. There are problems still to be licked.

"However, the additive does give fantastic power increases," Ethyl said.

Other items discussed include:

Spark plug cleaners and testers—Champion will soon introduce its Series 800 service unit. This unit has built-in automatic water trap, and a separately used abrasive chamber so that only clean abrasive is used. The series also incorporates a new system of testing and comes equipped with a three-wire power lead with two-prong adapters.

Vapor Blast Manufacturing Co. has introduced its small economy Model 530 spark plug cleaner for use by smaller airlines as well as for secondary facilities for larger airlines. The unit is compact and may be bench-mounted or set into a bench opening. Space required is a foot square.

The Vapor Blast unit consists of a slurry container and a quick snap-on cover, under which all vital parts are mounted. The slurry is circulated by an air ejector pump. Two nozzles with a special angular configuration blast the electrodes and the inside of the plug firing end.

The plug is manipulated with one hand and the blast air valve held down with the other. Airlines using pilot models report that cleaning time varied from 20 to 30 sec. per plug. A push-button, adjustable automatic timer-controlled solenoid valve is available as an accessory to the cleaner.

Receptacles for various sizes and types of plugs are available. From 20 to 25 cfm of compressed air are required to operate the cleaner.

Champion facilities—The company has started construction of a $1-million engineering research facility adjacent to the Toledo plant. Two buildings with total floor area of 35,000 sq. ft. are included in the project which will be the largest and most modern in the world for developing and testing spark plugs.

The larger of the two buildings will be of two-story, brick construction, and will house 29 engineering and research offices, two drafting rooms, and six laboratories for research and experimental work in electronics, chemistry, metallurgy and mechanics. The second building will house an engine laboratory. Completion is scheduled for July.

Champion manufacturing improvements—Several design developments are incorporated features of current Champion plugs. Ribs on shield barrels, different diameters of relief grooves between the hex and gasket flange, plus identification markings on the shell immediately above the hex allow machine inspection and color-coding. This insures that correct body parts and proper color identification were used on each plug, according to R. L. Anderson, Champion aviation service manager. The new production program became effective in April.

Continued program for improvement of core locking and elimination of oil seepage has been highlighted by locking copper sleeve at 4,600 lbs. press loading. Other improvements are adoption of dry graphite coating as assembly lubricant on copper locking sleeve, and improvement of the bore finish of the lower body locking sleeve cavity, Anderson said.

The RHA29E plug-type incorporating improved anti-fouling features was approved by Wright Aeronautical and CAA and released for production for use in R3350 engines.

Champion research and development—Considerable time is being spent in electrode alloy development. Champion is changing over to its improved alloy in the ground electrodes of all its plugs, according to Richard C. Teasel of Champion. In addition the Company is testing an Inconel-type alloy as a replacement for the "A" nickel used in the copper-cored center electrode construction of certain plug types.

Materials that have been proven to be most practical and economical are nickel-base alloys with about 80%, or more, nickel. The ideal nickel content seems to be in the vicinity of 95%, Teasel said.

Other Champion R&D programs concern the investigation of thermal physical properties of ceramics, ignition system characteristics and the effect of spark plug geometry on operating characteristics.

Lycoming develops small constant-speed drive

Lycoming Division, Avco Manufacturing Corp. has unveiled a mechanical constant-speed drive that is said to be more efficient, smaller and lighter than any comparable unit.

The unit was developed under a contract with the Navy's Bureau of Aeronautics and is designed to maintain 400-cycle ac generator speed in aircraft installations regardless of variation in input speed or electrical load.

The first unit is 20-kva size but Lycoming's design approach provides a basis for units up to 120-kva capacity.

The new drive eliminates the requirements for a large number of precision parts through a simple mechanical approach giving more reliable operation, simple maintenance and lower production cost.

How Resistoflex tackled problems of reusable fittings

by William Belle

RARELY does a company deliberately withhold a desirable new product from market. Yet this is exactly what Resistoflex Corp., Roseland, N. J. has done. Only now is the company willing to sell field-attachable and reusable fittings for use with its Fluoroflex-T (Teflon compound) hose.

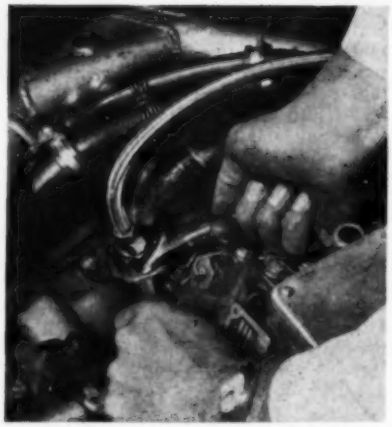
President Edgar S. Peierls said that although reusable fittings have been in high demand, his company would not compete until it was assured that its design was safe and reliable and that Murphy's law could not be invoked.

(Murphy's law asserts that if there is a way to do a job wrong, some mechanic will find it.)

Fittings and hose, which must be treated as an integral component, are used for across-the-board plumbing on any powerplant or airframe. In particular, the components are used in fuel and lubrication systems, hydraulic lines, pneumatic lines and vent lines.

The advantages of reusable fittings have always been recognized. Among these are: An inventory of various length lines with their permanent fittings is unnecessary. Hose and fittings are immediately available for engineering mock-ups and field emergency use. On-the-job cut-and-try procedures can be used.

The disadvantage to reusable fittings is their increased weight and bulkiness as compared with permanent or swaged type fittings.



FLUOROFLEX-T hose assembly with Seal-Lock fittings being installed on powerplant of a commercial airliner. If upper wrench were to overlap hex on socket of fitting and tend to rotate it in a counterclockwise direction, wrench could only tighten fitting to hose.

In the early development days of reusable fittings, the major difficulty was the fittings' susceptibility to separate from the hose, a condition called "fitting blow-off." Particularly in powerplant installations, this malfunction gave rise to grave fire hazards because of the possibility of fuel or oil breaking through the fitting and spouting onto hot surfaces. The problem becomes even more serious when high-temperature hose is involved, hose that must maintain its integrity above 450°F and 1,000 psi.

In these early days, too, many engineers accepted the blow-off deficiency as a calculated design risk that had to be taken in installations where the failure would not be critical. In other installations, the permanent fitting was used.

In their development of reusable fittings, Resistoflex engineers realized that at initial assembly nearly any such fittings would have a holding power equivalent to that of a swaged fitting.

The engineers also knew that unless positive preventative provisions were made, the fitting plus hose assembly would tend to disassemble. This is caused by vibration factors; differential expansions of the fitting parts, particularly onerous at high temperatures; creep of fitting socket under high hoop stress at elevated temperatures and pressures, and by mechanics on the line who accidentally unscrew fitting during maintenance.

To learn why Resistoflex did not tackle the reusable fitting problem sooner, we must go back to 1954. Then, performance requirements for

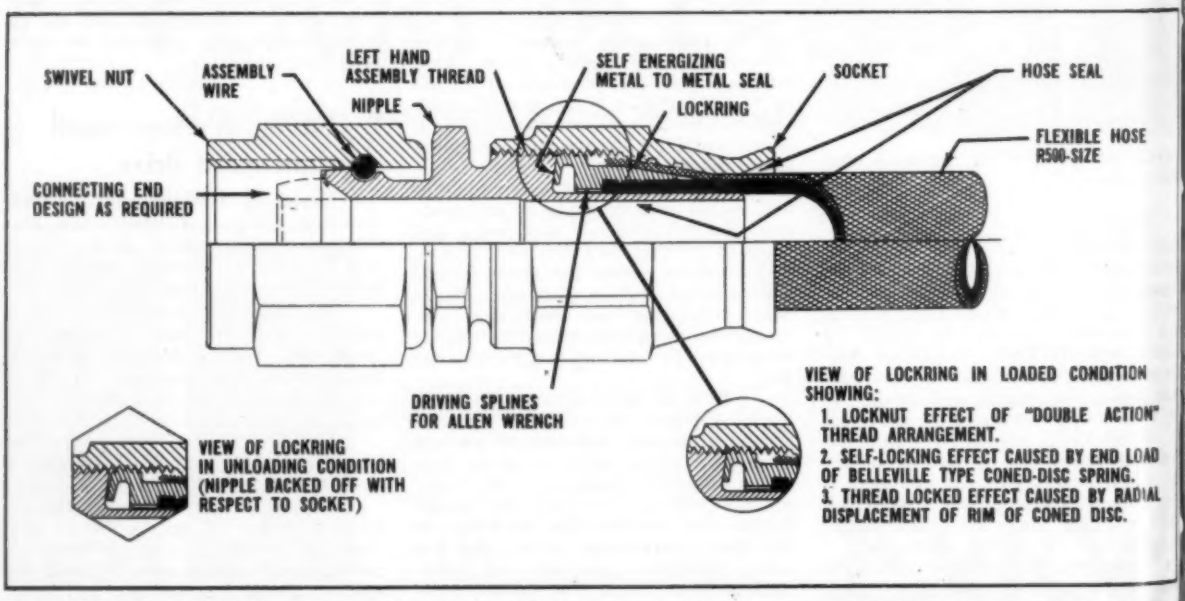


DIAGRAM of reusable fitting shows metal-to-metal grip of hose sheathing and the means of locking the hose to the fitting.

aircraft and missiles had risen almost asymptotically. Fluids and gases were being used which at lower temperatures had been only mildly harmful, but that now were proving extremely corrosive. Higher line pressures magnified the danger of leaks. The risks to personnel and equipment were compounded, particularly when supersonic craft flying at high altitudes were involved.

These were many variables to tie down all at once. The company felt that field attachability, while desirable for some prototype work, would merely add another variable to the already complex hose problem.

Later, other elements entered the picture. Instead of one standard swivel fitting for each size hose, jet designs then on the boards were calling for a high percentage of special fittings vastly more intricate and costly than the previous ones. Stocking each length hose and its appropriate fitting in bulk at worldwide bases was no longer practicable. The need for an entirely new concept of reusability was indicated, one not limited to short-term emergency repairs.

With these facts in mind, Resistoflex began setting up criteria for a reusable fitting that would be considered ideal for field attachable use:

(1) *Fitting must be easily assembled* by any competent worker.

(2) *Assembly should be positive* and not dependent on judgment.

(3) *Assembly should be foolproof* and components should fit together only one way.

(4) *Grip on hose must be permanent* and leakproof but must not damage the hose.

(5) *Fitting should be tamperproof* such that it cannot be loosened accidentally or by vibration.

(6) *Finished assemblies should perform* as consistently and dependably as though factory assembled by trained workers under close supervision.

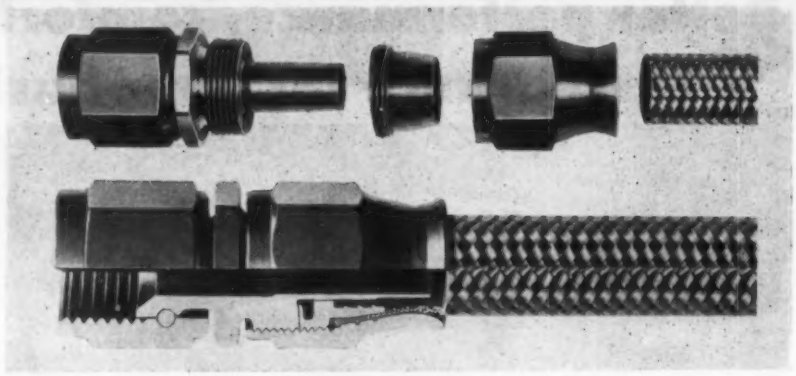
Other factors:

(1) *None of the parts* should be liable to damage or distortions by the act of assembling or disassembling.

(2) *Finished assemblies* made with fittings that have been repeatedly assembled and disassembled must always function as well as they did originally.

The key to the Resistoflex design which seeks to fit these criteria is in two design innovations, a left-hand thread on the socket and a positive locking device.

Using a left-hand thread is a simple thought, but one that had never been used in reusable fittings. When a mechanic tightens the installation threads on a fitting, he should use two wrenches. One tightens the fitting and the other prevents rotation of the hose. Nevertheless, some hose rotation always takes place, which leads to a loosening moment on the installation threads and consequent disassembly under vibration. But when a left-hand assembly thread is used, the hose torsion serves to increase rather than decrease the holding power of the assembly.



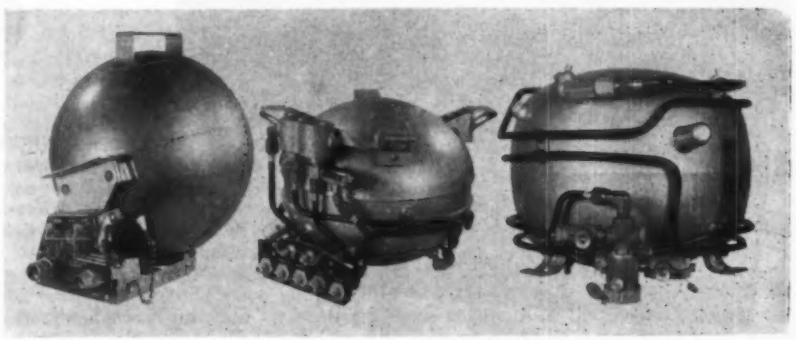
RESISTOFLEX reusable fittings comprise three easily assembled parts.

The locking device, or "Seal-Lock" as the manufacturer calls it, was designed into the fitting because any slackening in the metal-to-metal grip between the hose sheathing and fitting would significantly dilute holding power and cause severe damage. As an example, a 0.002-inch loosening in the metal-to-metal grip gives complete relaxation of the bond.

Three factors are marshaled to ensure positive locking. It can be seen from the assembly drawing that there are two male threads in a common female thread. This provides a locknut effect. In addition, a Belleville type coned-disc spring gives a lock washer effect. And finally, the radial displacement of the Belleville coned-disc rim produces a thread-locking effect.

Resistoflex points out that its reusable fittings should be considered as supplementing rather than replacing the permanently attached crimped-on fittings, which still retain the advantage of being lighter and less bulky.

Liquid-oxygen converters: standardization needed



ILLUSTRATING lack of standardized liquid-oxygen converters, here are three different shapes of five-liter converters manufactured by one supplier.

Need of standardized shapes for liquid-oxygen converters is confronting manufacturers of liquid-oxygen equipment. In many cases, the airframe designer assigns "left-over" space for the converter, which the equipment manufacturer must custom-design to fit.

Results of this lack of standardization are high original equipment cost to prime contractors and military, plus difficult maintenance at times.

The problem is becoming compounded, according to some manufacturers, because of expanded and anticipated converter uses. These include, besides the standard use of pilot oxygen equipment for breathing, the following applications:

(1) Using an inert liquid, such as nitrogen, as an actuating power source to feed a gaseous system for landing-gear and control-surface boost. Such a system is being considered for 1,000°F service and is being used in some liquid propellant rockets to pressurize propellant tanks.

(2) Using an inert gas under pressure to purge fuel tanks.

(3) Injecting oxygen into jet engine combustion chambers to restart or prevent jet flame-out at high altitudes where there is an insufficient supply of ram air.

(4) Using high-pressure gas for an emergency energy source and for maintaining absolute pressure in those instruments needing it.

(5) Using liquid nitrogen through a converter to cool electronic equipment and possibly for transpiration cooling during aircraft re-entry.

(6) Applying low-temperature systems to electronic circuits operating in the cryogenic range of —450°F. A cooling system of this nature requires a double-vacuum jacketed container. The inner vessel stores liquid helium or hydrogen, while the outer vessel holds liquid nitrogen or oxygen, which serves as an insulator.

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New facility marks step forward in gyro development

by Henry P. Steier

ANOTHER major step in improving the art of making gyroscopic devices was taken last month when the world's "most jiggle-proof" plant was opened.

It is the new inertial guidance plant built for the Aeronautical Division, Minneapolis-Honeywell Regulator Co., in St. Petersburg, Fla.

The $4.5-million structure is probably the first such separate facility built to help push back the frontier of design, production and measurement capability against which gyro design engineers have been straining.

At a recent first public showing of the new facility, Melvin P. Fedders, vice president and general manager, Florida plant, explained M-H's choice of the Florida location, and company engineers reviewed current and future projects and planning for inertial guidance work.

Fedders said the present 98,000-sq. ft. facility represents only about half the original planned area but changes in government spending necessitated the curtailment of the full area originally planned.

Principal factor in selection of a Florida site was freedom from vibration effects from the earth's interior and crust.

Vibration has become a challenging limitation in gyro development since its existence has a big influence on evaluation of advanced IG sensing components.

Many locations surveyed

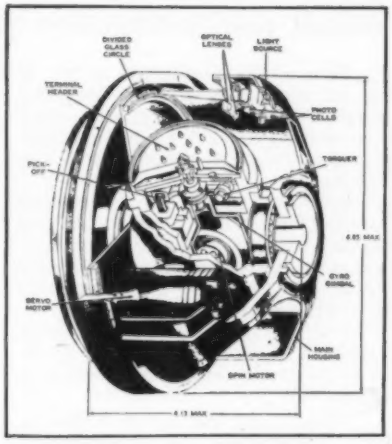
The goal was a plant which vibrated less than 7 micro-inches for frequencies from 5 to 100 cycles per second. The Aero division plant in Minneapolis, Minn. where the company pioneered in its gyro work had a vibration amplitude of 30 micro-inches.

After surveying 21 locations through the U.S., M-H decided the Florida site best suited its needs.

The survey showed that effects of man-made vibrations from trucks and trains were negligible. Seismographic records showed that earth slippage known as "earth tides" were at a minimum and would have little effect on testing of gyros of 0.001-degree-per-hour accuracy in the facility.

The "tides" are believed to be caused by gravity influences of the sun and moon and seasonal wide temperature variations. Variations in soil moisture also cause variations in transmission and amplitude of "earth noises."

This was taken care of by a special system of drainage canals that control soil moisture. To insulate even further



HONEYWELL'S type PGIA digital accelerometer now in limited production for use in future inertial platforms. Digital output goes to digital computer under development at M-H for future inertial platform systems.

against residual noise, the entire floor of the gyro test room is insulated from the rest of the building by a damping plastic.

One special room in the plant is used to induce vibration artificially into components for test purposes. This is necessary to determine environmental effects in aircraft and missiles.

The vibration equipment used rests on a mass of lead weighing 25 tons balanced on a knife edge support to aid in reducing vibration transmission.

M-H says that gain in the gyro-making art permitted by the new low-vibration level will also be aided by the relatively dust-free atmosphere achieved in the new plant.

This is of paramount importance in fighting friction. Friction is a basic limitation on accuracy of inertial guidance components. Microscopic dust effects it severely.

According to M-H, dust count in its new facility is 15,000 microns per cubic foot as compared to 60,000 in gyro rooms elsewhere.

The feasibility of using inertial devices to guide and control future aircraft, missiles and space vehicles hinges on a multitude of interwoven manufacturing, measurement and material problems.

According to an M-H engineer, the reduction of friction, and magnetic or other types of coupling has permitted the vast reduction in drift errors of today's gyros compared with those of World War II.

For example, the rate, 10 degrees an hour then, is about 0.001 now. Some idea of the microscopic accuracy needed today is evident in these examples if overall platform accuracy needed is 1 nautical mile at Mach 1:

Gyro drift rate—0.0083 degree per hour (equivalent to one revolution per 5 years).

Accelerometer error—0.00015g (equivalent to one inch of movement in 570 feet).

Azimuth alignment—0.00083 radians (equivalent to 0.048 degree).

Information must be integrated

Information from these sensing sources must be integrated to derive precise position accuracy possible with the new components. At Mach 2, for an accuracy of one mile per hour, the integrator would have to perform within 0.04 percent of perfect. This is equivalent to a one-mile calculation error in 24 hours.

Accuracy of voltages which must be measured under these conditions are such that they approach standards

MINNEAPOLIS-HONEYWELL'S Aero division facility in St. Petersburg, Fla. was selected after studies showed effects of earth "tides" and slippage were at a minimum for accurate measurement of gyro performance. Movement is less than 7 micro-inches.

known previously only in the laboratory.

The company has begun work on a digital computer for use with future platforms. This work is being done without contract support.

Computer with 5,000 "memory" coils will be used to integrate data from the gyro sensing devices. It is believed such a computer, when transistorized, would offer advantages in computation accuracy, size, reliability and ruggedness over analog computers now used.

M-H now has in limited production a digital type accelerometer planned for use with a digital computer. The device provides a digital output and has a threshold sensitivity of 1×10^{-5}g with an unlimited velocity range in vertical or horizontal positions.

The accelerometer uses a pendulous gyro. Photocells sense divisions on a moving glass circle to provide digital pulses for a computer.

Resolution of this device is low compared to the signals from advanced accelerometers which provide variable voltage type of output, but improvements in optics may increase the resolution.

One suggested use of a digital-type system is for air transport inertial platform navigation applications. Digital devices now available have limitations in terms of flight time, but these might not handicap some types of transport operation.

John W. Anderson, director of engineering at the St. Petersburg facility, said, however, that "significant gains in cost and weight must be made to make inertial guidance feasible for civil use."

Reviewing the status of M-H work in inertial guidance and control, Anderson listed these development projects as now on the books:

1. *Prototype reference system for Titan missile.*
2. *Components for Thor.*
3. *Snark missile components.*
4. *Controls for Regulus.*
5. *Study and evaluation of an azimuth alignment system for an air-to-surface missile.*
6. *Flight control and navigation system for the Avro CF-105 Arrow.*
7. *Fighter-type IG platform system.*

One platform system, the ISIP (Inertial System, Indicating Position) is now undergoing flight test by the Navy.

Another inertial platform was developed for the WS-107 ICBM and released to production. This work was later terminated when the system was found to be unnecessary.

Hold $3 million in contracts

Contracts held by the St. Petersburg facility now total $3 million of which $1.8 million is for an Air Force inertial guidance system under development for Wright Air Development Center.

Other work includes study programs on HIG gyro improvement, a statistical study of drift measurement methods and equipment used by M-H and other manufacturers, and a study of gyro uncertainties such as hysteresis, ainioselasticity, bearings and damping. Latter study is for Office of Naval Research.

To make headway in a technology already struggling with manufacturing tolerances measured in millionths of an inch, gyro engineers must get into the more fundamental properties of matter.

Anderson said molecular spaces between steel molecules must soon be taken into account; also, changes in shape of parts after they are made and the damping properties of materials themselves caused by internal vibrations.

Army, Navy test flat display tube for integrated cockpit instrumentation and blind flying

First details of progress on use of flat cathode-ray tubes for integrated cockpit instrumentation and blind flying were released at an Army-Navy Instrumentation Program symposium in Los Angeles.

Sponsored by the two services and Douglas Aircraft's El Segundo division and Bell Helicopter Corp., the symposium was opened to the airlines for consideration of new instrumentation possibilities for jets.

Douglas is the prime contractor for aircraft and Bell Helicopter Corp. for helicopter advanced instrumentation studies.

To test the concept of displaying flight information on a cathode-ray tube, a flat tube, digital computer and display generator system has been installed in a T2V-1 trainer.

The tube was developed by Kaiser Aircraft and Electronics Corp. It was invented by William Ross Aiken and is made under his direction at the Kaiser plant in Palo Alto, Calif.

Information processed by the computer is displayed on the cathode-ray tube to give the pilot a picture analagous to what he would see if actually flying contact.

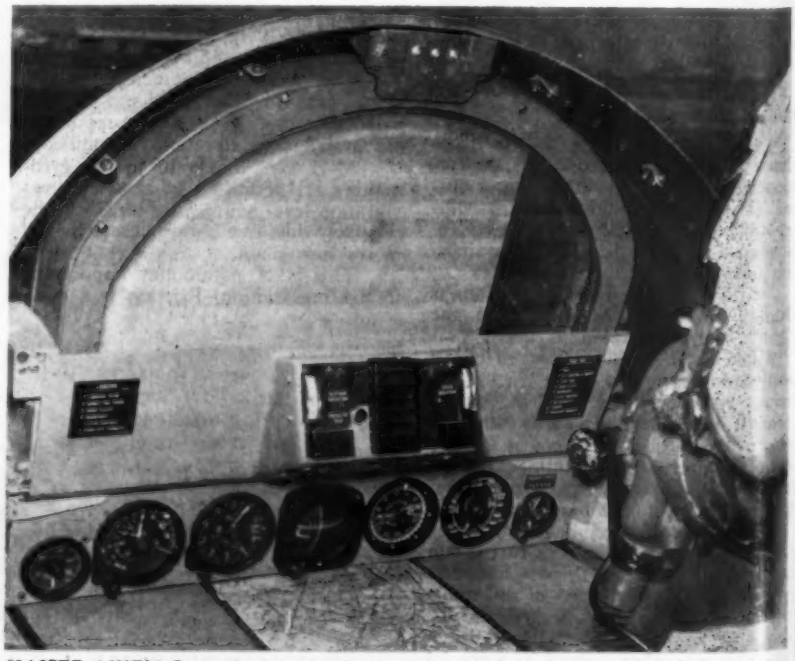
The present T2V-1 system appears to use a tube which is transparent only in one corner of the tube. Future tubes to be tried will be transparent across their whole surface. They will also be used as a window for contact flying.

Tubes with transparent phosphors to give two-color pictures are also being made by Kaiser and have a light loss of only 10-20%, so that pilots can fly contact as well as see information on the tube.

Although the present T2V-1 system also uses a pictorial navigation display on a table in front of the pilot, future systems will use another cathode tube for the purpose.

Bell Helicopter is making use of the analog display method in a helicopter flight simulator, portions of which are being built by Franklin Institute of Philadelphia.

A generator which converts a computer's signals to analog display signals is being built by Allen B. DuMont Laboratories, Inc. for use in a Bell HTL-7 helicopter for application to a blind flying system.



KAISER-AIKEN flat cathode ray tube in T2V-1 cockpit shows contact flying analog display. Stripes on tube are insulated plates in tube's deflection system. Note transparent area at right.

TWA report: jets will not tolerate inefficiency

It costs $911 an hour to fly Boeing 707-320, planning group tells top management; best economy speed is Mach .82

by Bernard Brown

"IT'S A THIN PIECE OF ICE we skate along between technological improvement and bankruptcy."

The speaker was Robert N. Buck, special advisor to Trans World Airlines President Carter Burgess, and the occasion was the presentation of a report on jet planning to TWA's top management by the company's jet planning committee.

In that single sentence Buck, a veteran airline pilot, shed some revealing light on the scope and precision of TWA's planning for the jet age in commercial aviation. Like every other major airline that is investing millions in new equipment, TWA knows it is gambling for heavy stakes.

The jet planning committee, headed by Capt. Floyd D. Hall, TWA's general manager for U.S. operations, has been at work for more than a year. The committee's report to its own top management represents the best thinking of a group of department heads who will be directly concerned with such things as schedules, airport facilities, passenger service, maintenance and stores, flight training, maintenance training and passenger-service training.

The fact that it will cost as much as $911 an hour in direct operating costs to fly a Boeing 707-320 places a heavy premium on efficiency in every phase of jet scheduling and operations. But, as Hall said, the jet is "very intolerant of sloppy organization and poor procedures" and, since TWA's investment in jets is "absolutely staggering," it must succeed.

Engineers and technicians who know most about the problems that will be encountered by TWA's jet fleet are confident it will succeed. Not all of the problems have been overcome; but they have been faced up to squarely, and some of them have been either solved or reduced in magnitude.

TWA has committed itself to an expenditure of $320 million for jets. It has on order 30 Convair 880s and 33 Boeing 707s. There have been repeated reports that Howard Hughes, whose Hughes Tool Co. owns 74% of the airline, has made an offer to buy 30 turboprop Bristol Britannias and is willing to spend up to $500 million to win undisputed airline leadership in the jet era (AMERICAN AVIATION, Aug. 12, 1957, p. 39). But thus far this deal is still hanging fire.

So, to date, TWA's jet planners have concentrated their attention on Convair 880s and Boeing 707-120s and 707-320s, which they know definitely they're going to have to fly and handle. And here are some of the things they have learned, as outlined by Russell K. Rourke, director of aircraft research:

The Convair 880 will be the fastest jet transport for at least seven to eight years, capable of 538 knots or 620 mph.

The Boeing 320 Intercontinental is slightly slower (527 knots or 605 mph) and is at least as fast as the Douglas DC-8, possibly faster.

The Boeing 120 is the slowest of the three at 510 knots or 585 mph, but can hold its own with the DC-8.

Speed races between airlines are uneconomical, says Rourke, but "if anyone wants any they will be looking at the tailpipes of TWA jets."

However, there is a proper speed and altitude for minimum cost. Piston-engine planes generally have the lowest operating costs at maximum speed and optimum altitude. The jet "likes" a speed somewhat less than maximum. Cost per airplane-mile diminishes as the cruising speed increases, however.

On the other hand, fuel costs per mile increase with speed because the power required increases as the cube of the speed, plus the added effect of compressibility drag.

When fuel costs are combined with other costs, the jet has a characteristic designated minimum cost speed, which occurs at all altitudes and around a speed of Mach .82. When operating on either side of this low point, costs per mile increase up to 7 cents.

The table on this page reveals comparative operating costs of the Convair and Boeing jets and the Lockheed 1049G. Whereas the 1049G costs $1.49 per plane-mile, the Convair costs $1.54, the Boeing 707-120, $1.93 and the Boeing 707-320, $2.10.

For first-class service per seat-mile, the Convair costs only 1.92 cents as compared with 2.4 cents for the 1049G, while the Boeings cost 1.68 cents.

The jet also has the characteristic of having its lowest operating cost at higher altitudes. With each step of altitude, costs decline.

On an average trip of 750 miles, the total cost per hour of operating a 1049G is $386. For the Convair 880 it is $693, for the Boeing 707-120 it is $853 and for the 320 it is $911 per hour.

Obviously, it takes careful planning not only by engineers but by cost accountants to figure out the best policies and procedures for operating commercial jet aircraft. If minimum operating cost procedures are adhered to, says Rourke, the savings in annual operating costs could be $2.5 million!

By May, 1959, TWA will be ready for its first jet flight across the United States and here, roughly, is what might happen:

Flight 712-28—a Boeing 707-131 (that's the official designation for TWA's 707-120)—is scheduled to depart Los Angeles at 5 p.m. Pacific Daylight Time. It will arrive at New York International Airport 4 hrs. and 45 mins. later, if the weather is good.

But eight hours before flight, the

Comparative costs of TWA jets versus piston aircraft

Operating cost	Convair 880	Boeing 707-120	Boeing 707-320	Lockheed 1049G
Per airplane-mile	$1.54	$1.93	$2.10	$1.49
Per seat-mile (first-class service)	1.92 cents	1.68 cents	1.68 cents	2.40 cents
Passenger load factor required to break even (excluding cargo)	62%	57%	55%	75%
For a 750-mile average trip, per hour	$693	$853	$911	$386
Percentage increase over Lockheed 1049G	180%	220%	236%	....
Operating costs in relation to total direct costs				
Crew salaries	9%	8%	8%	13%
Insurance	6%	6%	6%	6%
Fuel	41%	40%	37%	32%
Maintenance & overhaul	25%	26%	28%	19%
Depreciation	19%	20%	21%	30%
Passenger capacity	80-109	115-152	125-164	....

New York flight dispatcher routinely checks fuel requirements to determine if any load problem is likely. Latest weather map at 8 a.m. Eastern Daylight Time discloses a low-pressure system over South Carolina. Rain, low ceilings and restricted visibility already have spread as far up the coast as Norfolk, Va.

TWA's own forecast calls for rain to begin at New York by 8 p.m. EDT, with the ceiling and visibility lowering rapidly. The low should be located over Washington, D.C., by midnight, with ceilings of 200 to 500 ft. and visibility one to two miles, covering an extensive coastal area, bounded by the Alleghenies to the west.

The best alternate field, therefore, will be west of the mountains: Dayton, Ohio, an approved jet alternate, which should be free from effects of the low.

Preliminary flight plans prepared by TWA's winds analysis unit indicates the flight will take 4 hrs. 28 mins. from takeoff to touchdown flying at 31,000 ft.—the preferred altitude—along the "least-time" track. But three hours prior to Flight 712's departure, the New York dispatcher reviews the previous plans, weather trends and latest forecasts and his flight dispatch release to Los Angeles specifies a desire for the flight to arrive over New York with 30,000 lbs. of fuel.

Total fuel required for the trip is estimated at 55,600 lbs., plus 6,000 lbs. of water to be used during takeoff and initial climb. Total fuel requested for the flight is 85,600 lbs. Permissible gross weight for the takeoff will be 236,600 lbs., restricted by the allowable landing weight of 175,000 lbs. at New York.

Two hours prior to the scheduled departure, the winds analysis unit sends the flight plan along the minimum time route at optimum altitude. Prior to preparing this flight plan, a conference has been held among regional meteorologists, winds analysis unit and regional flight dispatchers to discuss and determine the best routing based on forecast winds and weather.

The forecast of upper winds and weather calls for the flight to be made on Victor 1518 airway over Albuquerque, N.M. to Tulsa, Okla., thence Victor 1514 to St. Louis and Victor 1512 to New York. The Victor 1500 series airways are high-altitude, cross-country expressways adapted to longhaul flights.

A pressure altitude of 31,000 ft. with a cruising speed of Mach .81 will afford the least trip cost, namely a true airspeed of 81/100, the velocity of sound in the surrounding atmosphere. For the forecast en route temperatures of −52°F, the flight's true airspeed will run about 546 mph.

If the flight does land in New York, 4 hrs. and 22 mins. will have elapsed from takeoff to landing, or 4 hrs. and 37 mins. from the time of taxiing away from Los Angeles until the engines are stopped in New York.

One major problem occurring at takeoff concerns the holding period, with engines running at the end of the runway awaiting takeoff clearance. The 707 will burn 4,400 lbs. of fuel per hour with the engines idling on the ground.

TWA proposes that during periods of heavy traffic, the flight should be held at the passenger landing ramp until 15 minutes prior to expected takeoff clearance. When the plane is loaded and ready to start engines it will contact the tower for a takeoff sequence.

This procedure, however, will depend on the cooperation of the airport tower, air traffic control and the other airlines. It is said to be the principal reason why bypass taxiways are being planned at some major terminals.

TWA jet planners recognize that this procedure will tie up gate space during busy periods at a time when gate space is short, but say the alternative is increased fuel reserves and engine time or intermediate holding areas with ground-support equipment, both of which are undesirable.

This is, of course, an industry problem. It is being considered by the Air Transport Assn's operations committees, but so far nothing more feasible has been proposed, according to Capt. J. B. Leclaire, TWA's supervisor of flying.

When taxi clearance is received, the 707 will be taxied out with four engines operating. "There are no plans for towing a loaded aircraft to the end of the runway," says LeClaire.

Flight crews will be cautioned not to taxi too close behind other aircraft because of the possibility of the engines inhaling foreign material blown up by the other aircraft.

Other interesting facts about TWA's jets:

There will be no engine runup as practiced today for piston engines.

Within two and a half minutes after takeoff, the 707-131 will be 8,000 lbs. lighter. From the instant it leaves the runway, performance is noticeably better than that of the 1049G. The 707 will climb to 10,000 ft. in seven minutes and to 31,000 ft.—the desired altitude—in 30 minutes.

The 707 will normally cruise at between 25,000 and 40,000 ft. Its cruising speed will depend on the outside temperatures. Desired cruising speed for both Boeings and the Convair is .81 Mach, which is 549 mph on a standard day at 31,000 ft.

The big Boeing will carry 21,000 gallons of fuel, the small one 15,445 gallons.

Facts for filing

Ever since Pan American World Airways placed its order for the first Boeing 707 jet transport, the number of different model numbers for Boeing jets has grown at a pace almost equal to the number of airlines on the company's customer list.

Here is the key to the model identification system Boeing uses to distinguish variations of the 707 now on order:

Air France	707-328	(J75-powered Intercontinentals)
Air India	707-437	(Conway-powered Intercontinentals)
American	707-124	(J57-powered)
Braniff	707-227	(J75-powered)
BOAC	707-420	(Conway-powered)
Continental	707-124	(J57-powered)
Cubana	*707-320	
Lufthansa	*707-320	(J75-powered)
Pan American	707-121	(J57-powered)
Pan American	707-321	(J75-powered Intercontinentals)
Qantas	707-138	(J57-powered)
Sabena	707-329	(J75-powered Intercontinentals)
TWA	707-131	(J57-powered)
TWA	707-331	(J75-powered Intercontinentals)
Varig	*707-320	

** Specific designations not assigned.*
Editor's note: No orders have been announced for the shorthaul 727 and the lighter-weight 717 proposals.

AMERICAN AVIATION, NOV. 11, 1957

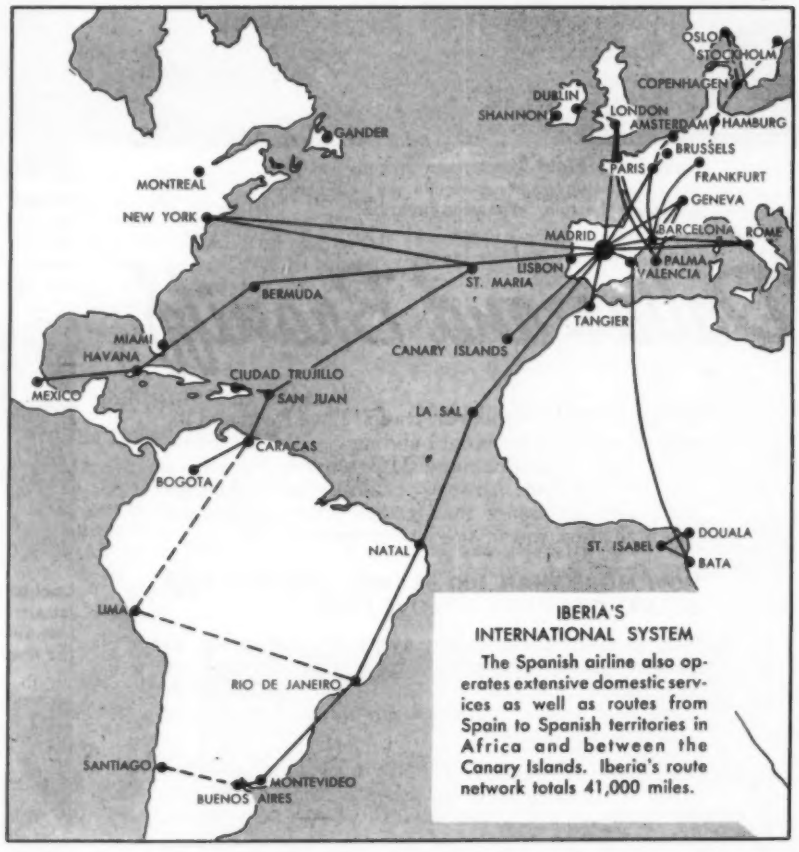
Iberia moves up ladder among European airlines

Handicapped by political factors and dollar shortage, Spanish carrier is just beginning to come into its own

by Anthony Vandyk

IBERIA now ranks among the top European airlines after a lengthy period of suffering from Spain's political isolation and dollar shortage. It was only this summer that the Spanish carrier was able to put pressurized equipment on its routes from Spain to England, France and Germany. It has only recently pulled DC-4s off the South Atlantic route and is still using this equipment on certain flights to Switzerland.

However, the era of the DC-3 and DC-4 on Iberia's international routes is fast coming to an end with the delivery earlier this year of five Convair 440s and more recently of two additional Super-G Constellations (bringing the total Super Connie fleet to five aircraft). The six DC-4s and 16 DC-3s, along with four Bristol 170 Wayfarers, will continue to be used on domestic services and on routes to Spanish overseas territories.



IBERIA'S INTERNATIONAL SYSTEM

The Spanish airline also operates extensive domestic services as well as routes from Spain to Spanish territories in Africa and between the Canary Islands. Iberia's route network totals 41,000 miles.

Surface transportation poor

Iberia's domestic operations are far more important than those of other European airlines. This is because of Spain's geographical situation with Madrid in the center and most other cities on or near the coast. Surface transportation is poor—the railroads are slow and there are virtually no long-distance buses.

Air fares are low for domestic services. For example, $7.20 buys a ticket for the 125-mile flight from Barcelona to Palma, Iberia's busiest route. In 1956 the airline carried 154,323 passengers on this route out of its total of 673,343 passengers (all but 100,919 were domestic).

Load factors on Iberia's domestic routes are impressively high, as these sample figures for 1956 show: Madrid-Seville, 80.4%; Madrid-Barcelona, 81.8%; Madrid-Vigo, 85.4%; Madrid-Santiago, 87.4%; and Madrid-Malaga, 81%. The average load factor for all domestic services and routes to Spanish overseas territories was 77.9%.

How about international load factors? Iberia's record here is less favorable but by no means bad. It averaged 54% for 1956. The busiest and best loaded international run is that from Madrid to Tangier. In 1956 Iberia hauled 12,434 passengers between these two cities.

The 1956 load factor on the Madrid-New York run was 49.3% with a total of 7,470 passengers carried. Iberia is particularly anxious to see the development of this route, inaugurated in 1954, since it provides a key to increased dollar earnings in a country that is desperately short of hard currency.

Although it has operated in the black since 1940, financial problems are the main reason why Iberia has not yet signed up for a fleet of jet transports.

Boeing salesmen have contracts ready for signature and there seems little doubt that eventually finance will be found to buy two or three 707s, the airline's apparent choice for its long-haul jet. In the shorthaul field, the Caravelle stands a good chance of being ordered by Iberia.

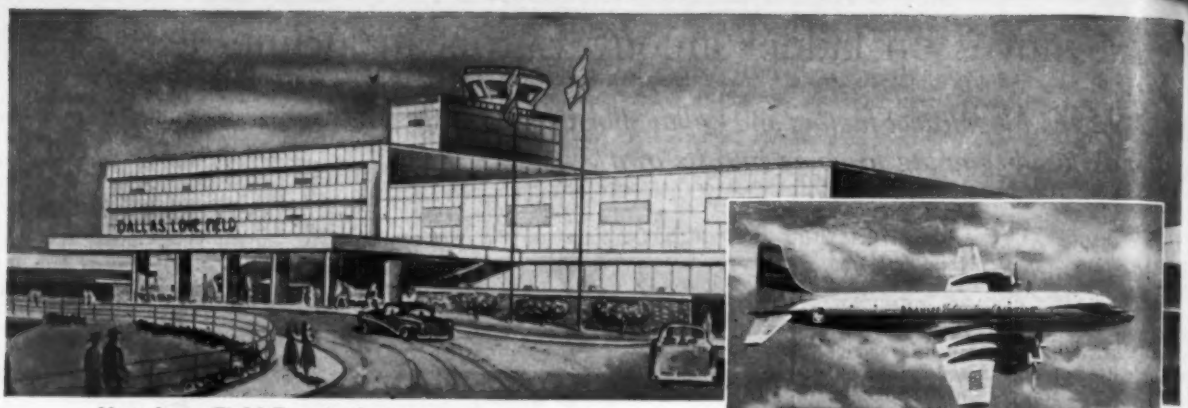
Reconciled to piston aircraft

While pondering the jet age and its attendant problems for the small fleet operator, Iberia is reconciled to operating piston-engine aircraft for many years to come.

The airline overhauls all its aircraft in its well-equipped shops at Madrid's Barajas airport. Daily utilization last year ran as follows: Super Connies, 6 hrs. 30 mins.; DC-4s, 7 hrs. 6 mins.; DC-3s, 4 hrs. 8 mins.; and Bristol 170s, 3 hrs. 54 mins.

This year (on Dec. 14) Iberia marks the 30th anniversary of the inauguration of its operations. In those 30

IBERIA'S five Super-G Constellations are used on the airline's four transatlantic routes and on services from Madrid to Rome.



New Love Field Terminal: Opening a new era in aviation progress . . . a part of Dallas' $25,000,000 airport expansion program.

Braniff's El Dorado DC-7C: Fastest, finest airliner flying within the U.S.A. and to South America. Now serving Dallas, New York, Washington, Nashville, Houston, San Antonio, Chicago and Latin America.

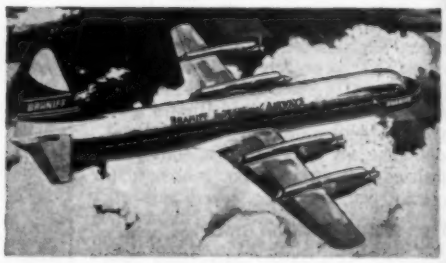
Dallas and Braniff

It's here . . . a new era in air travel! Love Field and its magnificent new terminal building . . . Braniff's new $6,500,000 Operations and Maintenance Base . . . the new Braniff Airways Building in Exchange Park . . . all assure that Dallas will maintain its top flight position in the jet-powered future.

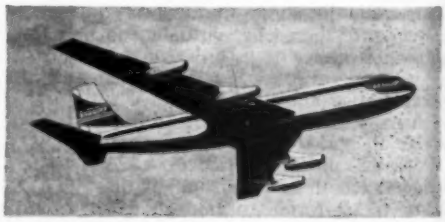
NOW MORE THAN 100 BRANIFF ARRIVALS AND DEPARTURES DAILY AT LOVE FIELD

The present 3582 flights a month will grow as Braniff constantly expands its services throughout the hemisphere and moves into the future with more new planes, more new flights, and more new facilities.

Today Braniff flies 16,422 route miles, linking Dallas with more than 60 other cities in the U.S.A. and Latin America. The Braniff team of 4,612 employees works together to provide you the finest in friendly, luxurious on-time air travel.



Lockheed Electra: A fleet of these newest prop-jet aircraft will join Braniff in 1959. This luxurious airliner will have a cruising speed of 410 miles per hour, with an increased seating capacity.



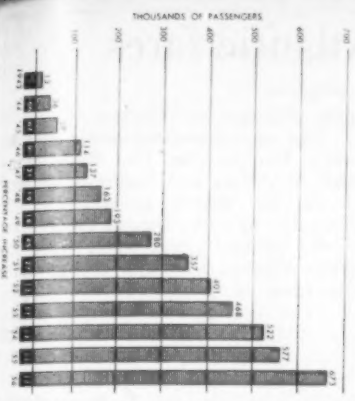
Boeing 707: Braniff will also start flying the world's finest, fastest jet airliner in 1959, bringing you the ultimate in swift, vibration-free, height-of-elegance air travel. The 707 will carry 109 to 136 passengers at cruising speeds up to 600 miles per hour.

General Offices
Dallas, Texas

BRANIFF *International* **AIRWAYS**

New Operations and Maintenance Base: Braniff's new $6,500,000 home base at Love Field will be the latest and one of the most modern in the world. It will house all operations, maintenance and hangar facilities.

New Braniff Airways Building in fabulous Exchange Park, to be occupied by executives and administrative personnel. Also located here will be Braniff's new Electronic Reservations Control Center, providing instant confirmation of reservations . . . the first in the world to serve an entire airline system.



PASSENGER TRAFFIC growth chart shows that about five-sixths of Iberia passengers are carried on domestic services.

difficult years the airline has had to overcome almost every problem imaginable. It has operated under various names and under leftist and rightist governments.

Using equipment of almost every type built and cut off from sources of supply for spares, Iberia has learned to improvise and to make the best of any situation.

Despite the difficult circumstances which it has had to overcome, Iberia has acquired an excellent reputation for safe and on-time operation. With its excellent past record and its fast-growing reputation as a competitive international airline, it can look to the future with confidence.

CAB expands terms of Resort tour certificate

CAB has expanded the terms of the renewed all-expense tour certificate it awarded to Resort Airlines last May. Acting on Resort's reconsideration petition, CAB increased the time of stop-overs at Miami to seven days and reduced the required number of stops outside the U.S. to two.

Original decision limited stop-overs at Miami to one-third of the tour's duration and ordered three intermediate stops outside the U.S. Renewal of the line's certificate for five years, ordered last May, was unchanged by the new order.

But Vice Chairman Chan Gurney, who voted for Resort in May, reversed his vote in view of the expanded terms. He indicated the more liberal provisions mean that Resort, in effect, has become the fourth certificated carrier in the New York-Miami market. President Eisenhower signed the new order Sept. 24.

CAA postpones to Dec. 1 new airspace control

Effective date for control of all airspace above 24,000 ft. for air traffic control purposes has been postponed one month to Dec. 1, CAA announced.

USAF and Navy, the primary users of this airspace, said the time between CAB's Oct. 2 regulations authorizing implementation of the plan and the original effective date of Nov. 1 was not sufficient for adequate pilot briefing and distribution of new maps and charts.

Meanwhile, first in-service tests of secondary radar for ATC purposes will begin next month in the new York area. Airlines that will participate have bought 187 ATC transponders.

Pacific Southwest orders Lockheed Electras

Pacific Southwest Airlines, California intrastate operator, has ordered three Lockheed Electra turboprops instead of the French Caravelle jet it was considering a few months ago.

PSA president Kenneth Friedkin, explaining the choice, said the Electra has "more usable floor space than any other medium-range jet aircraft." The plane will also be available for PSA's routes some six months earlier than other new aircraft, he added.

The Electra order, including spares, is valued at $8 million.

Delta gets three C-46Rs

Delta Air Lines accepted three C-46R freighters and has two more scheduled for delivery this month. Planes were purchased from Civil Air Transport. All T-category modifications and installation of radio and oversize cargo doors were made by American Airmotive Corp., Miami.

IATA conferees fail to agree on North Atlantic fares

FAILURE to break the deadlock on service patterns involving first-class, tourist and thrift fares resulted in a recess being called in the North Atlantic phase of the joint traffic conferences of the International Air Transport Assn. in Miami Sept. 24. Discussion will be resumed in Paris Nov. 19.

Main reason for the deadlock and its implied threat of open-rate warfare was inability to agree on how "austere" the so-called thrift class should be.

Most carriers now seem to be reconciled to three classes of service, with first-class at about $430, tourist at $320 and thrift at $260 (one-way New York-London) although the smaller ones are still hoping for just first and thrift, with the thrift class not too austere.

The big carriers, however, want to make thrift class markedly inferior to tourist. These big carriers feel that too high a level of accommodations and service in thrift class would make it too near the tourist class level. Another difficulty involving the North Atlantic situation is the proposal of certain carriers that an excursion of about 23 days' duration should be used as a means to lower fares.

Although the IATA meeting was unable to reach agreement on North Atlantic fares, it succeeded in agreeing to a worldwide pattern of fares and rates for the 1958-59 traffic year for other areas as follows:

Western Hemisphere—International fares within and between the Americas will be subject to some minor adjustments. New tourist and excursion fares will be introduced to develop new traffic, chief among them a special discount for groups of eight or more traveling together.

Mid-Atlantic—Tourist-class fares between Central America and Europe will remain unchanged. First-class fares will go up $20.

South Atlantic—First and tourist fares between South America and Europe will be increased 3%. Emigrant fares from some European countries will be introduced.

Europe, Middle East and Africa—Adjustments to individual fares resulting in some cases in increases of up to 5%. Present promotional excursion fare program will be continued and some new items added.

Europe, India, Far East and Australia—Little or no change in fares between Europe and India. Increases of 4% to 5% on tourist class and 6% to 7% on first-class services between Europe and the Far East and Australia. No increase in the Europe-Australia through fare.

Asia, Australia and the Pacific—Generally unchanged, with some increases, largely on first-class services.

Trans-Pacific—Fares over the North and mid-Pacific routes unchanged. On the South Pacific route, no change in tourist fares and 5% increase on first-class services.

Round-the-world and polar fares—No change.

General cargo rates will remain largely unchanged within the Western Hemisphere, throughout Asia and Australasia, and over the Pacific and polar routes, as well as on many routes within Europe and between Europe, India, Pakistan and Ceylon.

On other European routes, and between Europe, the Far East, many parts of Africa and Australia, as well as over the Atlantic, general rates will go up 5% to 10%. Despite the increase in the general cargo rates over the North Atlantic, no major changes have been made in specific commodity rates.

The meeting also approved a new Commodity Description Guide which should substantially clarify and ease the rating of specific commodities. Minimum charges for air cargo shipments were revised and slightly increased to cover the costs of handling small parcels. Actual charges will vary according to the part of the world concerned. The new cargo rates are proposed to take effect on February 1, 1958.

No Shows—The meeting agreed to try the effect of new ticketing time limits and reconfirmation procedures for international passengers beginning their travels in Canada and the U.S. and on return trips to Canada and the U.S. from gateway points in Europe.

Effective next March 1, passengers booking space on international services out of Canada, Cuba, Mexico and the U.S. more than three days prior to departure must pick up and pay for their tickets not later than 48 hours after their space has been confirmed. If they book less than three days ahead, they must pick up their tickets as soon as practicable.

Passengers who leave the United States or Canada for other countries on return trips or after stopovers of more than 12 hours will be required to reconfirm their reservations at least six hours before departure. This requirement is the same as now applied to domestic transport in the U.S. and Canada.

Passengers who have return or continuing reservations to the U.S. and Canada from the United Kingdom, Ireland and Continental European gateways will be asked to reconfirm their space at these gateway points 48 hours before departure. If they reach the gateway point less than 48 hours before departure, or if the stopover there is shorter, the requirement does not apply.

Conversion Rates—New regulations to govern the conversion of airline fares into the 112 currencies in which the airlines do business were also adopted by the conferences. Subject at all times to national legislation, they are designed to improve and simplify the work of traffic and accounts staffs and to eliminate abuses due to exchange manipulations and the weaknesses of certain currencies. Among other measures, they restrict the currencies in which fares can be published in any given country to three: dollars, sterling and local.

Jet Age Traffic—Looking ahead to larger aircraft, increased flight frequencies, heavier loads and the more

Summary of U.S. airline traffic for August 1957 vs. August 1956

Compiled by American Aviation Publications from Official C.A.B. Data

Airlines	Revenue Passengers 1957	Revenue Passengers 1956	Revenue Passengers % Change	Revenue Passenger Miles (In Thousands) 1957	Revenue Passenger Miles (In Thousands) 1956	Revenue Passenger Miles (In Thousands) % Change	Total Ton-Miles Rev. Traffic 1957	Total Ton-Miles Rev. Traffic 1956	Total Ton-Miles Rev. Traffic % Change	% Available Ton Miles Used 1957	% Available Ton Miles Used 1956
DOMESTIC											
American	671,913	696,138	—3.6	472,660	457,696	3.3	55,247,328	53,813,411	2.7	58.6	60.9
Braniff	172,248	147,947	16.4	76,937	60,981	26.2	8,244,984	6,574,884	25.4	48.5	54.1
Capital	375,207	284,967	31.7	141,832	97,273	45.8	14,803,053	10,136,871	46.0	47.9	44.9
Continental	82,386	63,956	28.8	40,203	24,257	65.7	4,173,969	2,537,395	64.4	48.0	48.7
Delta	233,047	199,659	16.7	113,983	94,742	20.3	12,343,041	10,311,823	19.7	56.6	53.7
Eastern	665,825	635,811	4.7	356,632	311,581	14.5	36,899,840	34,351,410	7.4	53.5	46.5
National	113,460	83,001	36.7	69,643	54,363	28.1	7,477,403	6,064,582	23.3	52.3	59.4
Northeast	103,605	83,513	24.1	29,172	16,553	76.2	2,911,088	1,568,962	85.5	46.2	60.0
Northwest	142,807	126,854	12.6	104,204	90,923	14.6	11,471,939	10,243,003	12.1	56.7	58.1
TWA	443,636	377,427	17.5	394,281	322,830	22.1	41,490,228	34,791,215	19.2	61.6	64.5
United	613,140	589,469	4.0	484,843	423,475	14.5	55,180,066	49,049,318	12.5	60.2	62.7
Western	132,617	108,555	22.2	69,721	55,977	24.5	7,277,100	5,844,055	24.5	59.2	57.5
TOTALS	3,749,891	3,397,297	10.4	2,354,111	2,010,651	17.1	257,510,039	225,286,929	14.3	56.8	57.1
INTERNATIONAL											
American	13,523	13,131	3.1	10,014	9,621	4.1	1,360,801	1,229,206	10.7	65.9	63.9
Braniff	4,452	2,991	48.8	9,203	6,224	47.9	1,105,398	781,803	41.4	50.4	56.3
Delta	6,841	5,495	24.5	8,194	6,359	28.9	961,320	688,462	39.6	61.4	54.1
Eastern											
San Juan	25,637	20,878	22.8	37,041	29,601	25.1	3,954,497	3,263,427	21.2	68.1	57.8
Bermuda	5,197	3,900	33.3	4,073	3,084	32.1	424,064	337,580	25.6	68.3	53.9
Mexico	2,641	***	....	2,422	***	....	249,517	***	....	55.9	***
National	6,443	6,496	—0.8	4,456	3,067	45.3	511,598	341,557	49.8	47.8	45.3
Northwest	13,736	12,272	11.9	29,605	26,842	10.3	4,737,968	4,605,902	2.9	73.8	76.6
Hawaiian	1,396	1,183	18.0	3,727	2,988	24.7	413,144	341,353	21.0	66.8	63.9
Panagra	11,547	12,487	—7.5	14,936	14,747	1.3	2,082,643	1,937,727	7.5	59.0	59.3
Pan American											
Lat. America	118,505	119,660	—1.0	127,654	112,982	13.1	16,494,271	13,863,992	19.1	66.5	63.6
Atlantic	123,132	112,786	9.2	164,708	146,944	12.1	20,308,284	18,166,476	11.8	63.4	62.5
Pacific	30,692	31,385	—2.2	117,076	91,389	28.1	14,206,098	11,738,638	21.0	72.0	75.6
PDX/SEA-HON	1,949	1,696	14.9	5,389	4,564	18.1	599,395	479,562	25.1	55.7	63.3
Alaska	10,113	9,486	6.6	11,013	10,429	5.6	1,455,709	1,531,532	—5.1	59.7	62.3
TWA	33,533	30,470	10.1	91,125	80,326	13.4	10,906,851	9,876,037	10.4	63.7	70.1
United	13,569	12,065	12.5	33,683	29,985	12.3	3,610,301	3,211,918	12.4	77.8	77.3
Western	1,469	***	....	2,284	***	....	252,614	***	....	51.0	***
TOTALS	421,030	393,502	7.1	667,487	571,600	16.8	82,621,934	71,574,257	15.4	66.1	66.3

***Operation began in July 1957.
Note: Northwest Hawaiian and PAA Honolulu figures shown for information only; individual carrier totals include these figures.

LOCAL SERVICE											
Allegheny	46,859	40,597	15.4	8,273	6,701	23.5	836,291	676,329	23.7	47.7	44.1
Bonanza	14,118	11,451	23.3	2,985	2,530	18.1	298,148	255,724	16.6	43.8	43.1
Central	12,647	8,897	42.1	2,546	1,734	46.8	260,211	178,986	45.4	34.1	30.7
Frontier	22,845	18,581	22.9	5,993	4,871	23.0	672,560	554,327	21.3	72.0	57.9
Lake Central	15,789	13,319	18.5	2,471	1,999	23.6	256,818	197,234	30.2	41.3	33.8
Mohawk	40,130	33,942	18.2	7,793	5,850	33.2	793,429	585,327	35.6	46.7	55.2
North Central	67,962	56,677	19.9	11,290	9,163	23.2	1,145,797	932,063	22.9	51.0	49.9
Ozark	40,567	30,305	33.9	6,711	4,678	43.5	691,467	480,192	44.1	46.5	39.5
Piedmont	40,499	40,739	—0.6	8,652	7,793	11.0	871,064	788,906	10.4	60.7	57.6
Southern	20,104	17,719	13.5	3,721	3,094	20.3	378,763	321,675	17.7	41.0	43.7
Southwest	33,853	30,291	11.8	7,286	6,136	18.7	717,018	605,638	18.4	59.6	52.4
Trans-Texas	22,203	20,589	7.8	4,960	4,662	6.4	523,633	490,532	6.7	41.4	36.9
West Coast	26,367	22,600	16.7	4,599	3,911	17.6	453,422	365,099	24.2	51.9	50.3
TOTALS	403,943	345,707	16.8	77,280	63,122	22.4	7,898,621	6,432,032	22.8	49.8	47.2
ALASKAN											
Alaska 1/	6,471	7,285	—11.2	1,945	2,010	—3.2	421,837	535,079	—21.2	49.7	54.7
2/	599	752	—20.4	863	1,229	—29.8	297,193	422,819	29.7	38.7	52.8
Alaska Coastal	7,638	6,844	11.6	647	631	2.5	78,547	72,726	8.0	69.7	65.2
Cordova	2,295	2,336	—1.8	558	417	33.8	241,562	395,249	—38.9	53.0	51.0
Ellis	7,986	7,916	0.9	454	406	11.8	52,505	47,137	11.4	66.6	65.2
Northern Consolidated	2,647	3,224	—17.9	904	1,111	—18.6	200,870	470,978	—57.4	66.9	82.1
Pacific Northern	15,085	16,192	—6.8	15,868	13,305	19.3	2,123,081	1,892,236	12.2	70.1	69.2
Reeve	1,363	1,300	4.8	1,044	695	50.2	169,420	137,689	23.0	53.7	76.1
Wien Alaska	4,540	5,466	—17.0	1,631	2,315	—29.6	541,226	1,474,888	—63.3	65.1	94.2
TOTALS	48,624	51,315	—5.3	23,914	22,119	8.1	4,126,241	5,448,801	—24.3	....	....

1/ Intra-Alaska
2/ States Alaska

HELICOPTER SERVICES											
Chi. Helicopter	7,140	.....	....	115	.....	....	13,110	2,814	365.9	29.2	43.5
Los Angeles Airways	3,462	2,355	47.0	124	86	44.2	17,949	13,715	30.9	66.8	49.7
N. Y. Airways	6,983	4,300	62.4	130	81	60.5	16,056	10,503	52.9	45.7	64.4
TERRITORIAL SERVICES											
Caribair	20,708	16,816	23.1	1,507	1,148	31.3	162,530	112,498	44.5	62.3	62.1
Hawaiian	56,453	53,503	5.5	8,498	7,408	14.7	816,290	758,794	7.6	60.2	59.5
Trans-Pacific	19,869	29,445	—32.5	3,996	3,727	7.2	320,729	296,112	8.3	64.0	57.1

complex schedules of the jet age, the conferences approved a number of measures to streamline fares computation, sales and accounting and passenger handling. As the result of several years of study by a special Simplification Group, it set up a program to examine the possibilities of calculating fares by electronic computer, including new letter codes and format for the fares tables.

Recommendations were also accepted for standardizing flight and other announcements over airport public address systems, and for numbering the seats in aircraft, as well as new methods of reproducing numbers on baggage tags for quicker recognition and handling at airports.

Other Matters—The meeting reviewed and considerably amended resolutions governing the charter of aircraft, taking note of the differing requirements of various governments.

Even the most experienced traveler finds something new to talk about in South America

Cuzco, Peru, was capital of the amazing Inca Empire's early civilization. This cathedral is built on a foundation of artistic Inca stonework. Young man with horn, at top, is calling townfolk to church.

And the friendliest continent of them all is only overnight from the U.S.A. by Panagra DC-7

No matter where else you've been, you have yet to see such exotic variety. Quaint Spanish architecture next door to fine modern hotels. Flowered cities flanked by the grandeur of the Andes. Lively casinos. 50¢ steak. Restful resorts where you take a holiday from high prices.

Lowest fares ever! 30% off regular fares brings South America within reach of everyone. On 28-day *Pan Am Holiday* #703 you visit six Latin countries for only $988.40 from New York. Your round-trip flights, hotel rooms, local sightseeing are all included. You travel on swift *El Pacifico* DC-6Bs, daily all-tourist service. You can also get the 30% discount on deluxe *El InterAmericano* DC-7s. Both *El InterAmericano* and *El Pacifico* are equipped with radar and fly daily over the routes of National Airlines, PAA and Panagra. Send for valuable 128-page book of up-to-the-minute facts about what to see, do, and take home from South America. Only 25¢. Write Panagra, Dept. A, Chrysler Building, New York 17, N.Y. For reservations, see your Travel Agent or Pan American, U. S. Sales Agent for—

PANAGRA

PAN AMERICAN-GRACE AIRWAYS

TRANSPORT TRENDS

October, historically a good traffic month for domestic airlines, was disappointing. Load factors were below expectations for most lines. Coupled with a similar experience in September, carriers are having the most unfavorable autumn in some time. Hopes that usual fall surge would bolster sagging earnings of first nine months have now faded. And 1957 earnings may be 50% under 1956.

Most pressing and important issue for airlines in CAB's General Passenger Fare Investigation is an early fare increase. But the case also carries implications reaching far into the future. Inherent are policy matters which, when determined by CAB, will govern fares, rates and earnings for decades. Most important policy matter: whether CAB will decide to determine "reasonable earnings" on the basis of a fixed rate of return on investment or on the operating ratio technique favored by industry.

Here's a rundown on recent equipment developments: United Air Lines, reportedly favoring the Convair 880 as its short- and medium-range jet, nevertheless has been taking a new look at Boeing's proposed Model 717. It's also been talking to Convair about possibility of putting 24 instead of 22 rows of seats in the 880 . . . Capital Airlines experimented with upping seating capacity of Viscount from 44 to 48. Idea was dropped because seating was too cramped . . . Northeast Airlines scrapped plans to buy DC-7s. Move was considered because of Britannia delays, but expense was too great.

CAB's deferral of a decision in the otherwise completed St. Louis-Southeast Service Case has, in effect, created a consolidated proceeding of the same magnitude as the big route cases of 1955-56. Both the St. Louis and Great Lakes-Southeast cases will now be decided at the same time, probably early next year.

Bristol Britannia's troubles may soon be cured. A form of boundary layer control has been tested in Britain and it may solve the icing trouble of the plane's Proteus engines. New technique involves supplying air from the compressor to insure that, by speeding up the airflow around the intake bend, ice does not build up at this critical point.

Five-year-old Large Irregular Air Carrier Investigation, in which CAB is to determine the future role of non-skeds, comes alive again this month. Oral argument is scheduled to open in Washington Nov. 12. Two years ago, by a 3-2 vote, CAB decided to license non-skeds as "supplemental air carriers." Decision was upset by Court of Appeals. Now the agency has all the issues before it again. Case is so complex, however, that a decision before next spring would be a major surprise.

Several small nations are getting increasingly worried about the competition their airlines will face from U.S. carriers in the jet age. This is one reason why there's more talk of capacity control in civil air negotiations with U.S. All Bermuda-type agreements refer to capacity and frequency, but wording is so vague that it's virtually meaningless. It's very doubtful if any nation will be able to persuade the U.S. to adopt a precise formula for capacity or frequency control. But several are planning to raise the point. One reason why recent U.S.-Brazilian talks were so prolonged was that Brazil was trying to insist on some form of capacity control.

Major issue on which House Committee on Legislative Oversight will concentrate initially is international air route decisions. This is the group that's investigating all government regulatory agencies, including CAB. Its investigators are now sifting through CAB files never before revealed in the old Pan American/American Overseas Merger Case and the still hot Great Circle-Pacific Case.

INDUSTRY

American to buy 40 more jets at estimated cost of $200 million if passenger fares are increased

American Airlines plans to buy 40 additional jet aircraft and is aiming at "virtually complete conversion" to a turbine-powered fleet by 1961. Although AA did not indicate the types of the new aircraft, it said 15 will be long-range jets and 25 will be intermediate jets.

These will be in addition to 30 Boeing 707s and 35 Lockheed Electras previously ordered. AA estimated cost of the additional planes will be "more than $200,000,000."

AA said the program is dependent upon a 15% increase in passenger fares. Details were given in the airline's statement of position filed in CAB's General Passenger Fare Investigation in which hearings open November 18. Eastern Air Lines and Trans World Airlines also advocated a 15% hike in fares in statements filed simultaneously.

AA president C. R. Smith advanced the equipment program reluctantly. Under other circumstances, he said, the details would not have been disclosed "until the last possible minute."

"But," he added, "I knew of no other way to bring to the CAB the fullest realization of the problem."

AA's equipment needs are based on studies showing an annual system need by 1961 of 12.7 billion seat-miles. This compares with a 1956 total of 7 billion. AA said it will retire or sell all present piston-engined aircraft except "about 15 DC-6s" which will be retained for short-range routes and cities not equipped for jets.

Canadair to market CL-44, transport version of bomber

Canadair's CL-44 transport version of the CL-28 patrol bomber will be offered on the commercial market, the Montreal company has announced. In its passenger configuration the turboprop transport will be known as the Canadair Liner. Its cargo version will be known as the Canadair Freighter.

Canadair is building the CL-44 for the RCAF and first deliveries will start late in 1959. Commercial versions of the aircraft could be delivered from the beginning of 1960.

Both the Canadair Liner and the Canadair Freighter will have a maximum gross weight of 205,000 lbs. and a maximum landing gross weight of 160,000 lbs. Maximum zero fuel weight will be 155,000 lbs. while the operating weight empty will be 101,194 lbs. and 86,121 lbs. for the passenger and cargo versions, respectively. Maximum speed will be 445 mph and a maximum range of 5,000 statute miles with normal fuel reserves will be possible.

The Canadair Freighter will be able to carry approximately 17,000 lbs. payload across the Atlantic at a cruising speed of about 400 mph and at a direct operating cost of between 4.5 and 5¢ per ton-mile. The Canadair Liner will be able to take 154 thrift-class passengers nonstop from New York to London at a direct operating cost of about 1¢ per seat-mile.

Powerplant of the Canadair transport is the Bristol Orion rated at 5,150 shaft hp.

Donald Douglas, Jr. elected president of Douglas

Donald W. Douglas, Jr., 40, has been elected president of Douglas Aircraft Co., succeeding his father, Donald W. Douglas, Sr., who remains board chairman and chief executive officer of the company. At the time of his election, Douglas, Jr. was vice president-military relations, a director and member of the executive committee.

DOUGLAS

CONANT

Frederic W. Conant, senior vice president, was elevated to the newly-created position of vice chairman of the board. Douglas, Sr. will "continue to shape and guide the policies and over-all direction of the world-wide organization he founded 37 years ago," the announcement said, adding that in his absence Conant will function as chief executive officer.

The directors also named John Dundas, vice president-administration, to be executive vice president and a director, and elected Gen. Ira C. Eaker, USAF (Ret.) as vice president in charge of the eastern offices of Douglas.

Dundas replaces on the board Harry W. Strangman, who resigned his directorship several weeks ago. Strangman remains treasurer of the company.

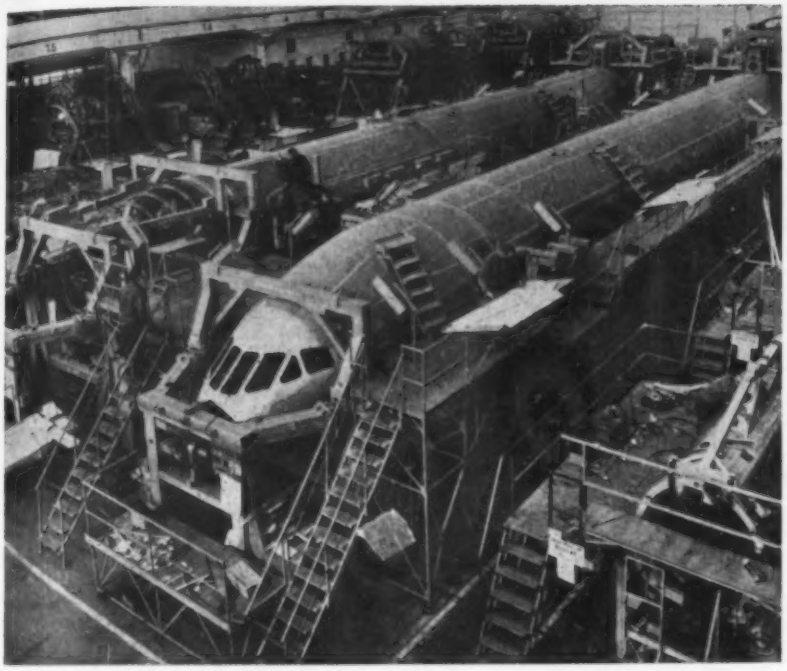
CAB approves United's 'custom coach' service

Civil Aeronautics Board has disagreed with its staff in approving United Air Lines' "Custom Coach" tariff. Board vote was 4-1 in favor of what United termed a "new class of service." Member G. Joseph Minetti dissented.

In opposing its staff, Board majority said it saw "no need to indulge in the semantics raised by bureau counsel and determine whether United's 'DC-7 Custom Coach' is a new class of service or only an improved coach service. The record is clear that the 'DC-7 Custom Coach' is sufficiently different from ordinary coach service in terms of cost and value of service to justify the fares set forth in United's tariffs."

The UAL tariff applies to certain DC-7 coach services between New York, Chicago and the west coast. New fares exceed standard coach fares by $1 between New York and Chicago, $2 between Chicago and the west coast and $3 on transcontinental flights.

Production of French jet stepped up



CARAVELLE PRODUCTION is now in an advanced stage at Sud-Aviation's Toulouse plant. Output is being built up so that by May 1960 four of the French jets will be coming off the line each month. If demand warrants this can be increased to seven aircraft monthly. Firm Caravelle orders to date involve 20 aircraft.

CAB staff proposes higher earnings rates for domestic trunks; bolsters case for fare boost

The Civil Aeronautics Board staff surprised the domestic trunkline industry by proposing increased rates of return in the pending General Passenger Fare Investigation. New rates will be supported in detail this month when hearings before CAB are scheduled.

Under staff's proposal, rates of return are 9% for the Big Four and 10% for the so-called regional carriers. This is a significant departure from the historic 8% return, most recent application of which was in CAB's rejection of a 6% fare increase for seven trunk carriers.

When weighed against the language used by the CAB majority, which rejected the 6% increase, the change in the staff's position is particularly significant. In that opinion the majority said:

"For the purpose of measuring the reasonableness of earnings, we shall use eight per cent, the rate of return applied by the Board in counless domestic rate proceedings, as the yardstick reflecting a just and reasonable level of earnings. There is no evidence that such a level was inadequate in the past and no carrier has introduced evidence into the record before us supporting a different rate of return . . . Bureau Counsel, in the absence of direct evidence of the carriers regarding rate of return, relied upon the conventional eight per cent rate."

This proposed return increase, which might bolster the industry's earnings arguments in the future, is contained in an obscure rebuttal exhibit submitted by the staff recently in the General Fare Case. It is not interpreted to mean a change of heart by the staff regarding an increase in fares *per se*. Nevertheless, it does reveal a recognition of changing economic conditions in the industry and an awareness that there is no longer evidentiary support for the historic 8% return yardstick.

Some effects of the changed position would be: American Airlines, on a staff-computed investment base of $137,225,000, would be entitled to $10,980,400 return under the old 8% formula, but a $12,353,000 return under the new 9% formula. Capital Airlines, on a staff-computed investment of $69,847,000 would be entitled to a $5,587,760 return under the 8% formula, but $6,985,000 under the new 10% formula for regionals.

The industry as a whole could possibly recognize additional annual earnings of between $15 and $20 million. Recently, the seven carriers involved in the 6% fare case were shown by CAB to have realized a return on investment for 1956 of 7.76%, barely under the historic 8% figure, but well under the new rates in which one percentage point means between $1 and $2 million per carrier in many cases.

Haggerty, Oswald join AAP staff

Further expansion and a promotion in the headquarters editorial staff of American Aviation Publications have been announced.

James J. Haggerty, Jr., contract writer for *Look* magazine, has been engaged as a contract writer on military subjects for AMERICAN AVIATION and *Aviation Daily*. He earlier was named by AAP as executive editor of the *1957-58 Aircraft Year Book*, to be published in January. His status with *Look* will be unchanged.

Elizabeth Oswald, who has had 15 years experience as a reporter and editor for Bureau of National Affairs, publishers of business newsletters, joins AAP on Nov. 25 to direct coverage of business news and analysis from the military services for AMERICAN AVIATION and *Aviation Daily*. She will also write for *Missiles and Rockets*. Mrs. Oswald succeeds Henry Simmons, resigned.

William V. Henzey, who for eight years has been AAP's reporter and editor of air transport news, has been promoted to chief transport editor. In addition to handling news and analysis for AMERICAN AVIATION and *Aviation Daily*, Henzey and his assistants will furnish material for *Air Cargo Magazine*, the news section of *Official Airline Guide*, and direct *Air Traffic News*, daily newsletter on tariffs.

Varig buys two Caravelles; has options on three more

Varig has announced an order for two Sud Aviation Caravelles at a total cost of about $5 million. The Brazilian airline also has taken option on three more of the French jet transports. First Caravelle is scheduled for delivery to Varig in June 1959.

Varig officials have said that the jets may be used on the carrier's run between New York and South America, serving as interim aircraft until long-range jets are received in 1960. Varig last summer ordered three Boeing 707s. The Caravelles also will be used on Varig's coastal routes serving Rio de Janeiro, Buenos Aires and Montevideo.

Curtiss-Wright increases price of Turbo Compound

Wright Aeronautical Div. of Curtiss-Wright Corp. has adopted a 6.2% increase in price for its Turbo Compound engines and spare parts effective Oct. 15. The change follows increases in labor and materials costs and raises the price tag for the DA-3 and DA-4 engines to $88,200.

National strike ends; wages to be arbitrated

The National Airlines' strike which shut down operations for 32 days and furloughed some 3,000 employees was settled late last month.

A key issue that delayed final agreement hinged on whether or not NAL would take back employees who walked off the job in wildcat strikes. These were responsible for the initial stoppage of operations. In reaching a final agreement, National agreed to take back all employees without prejudice.

Restoration of operations was begun by National on October 24 and the system was in full operation by October 27.

J. M. Rosenthal, NAL senior v.p.-industrial relations listed five points covered by the agreement:

(1) Current wages are to be arbitrated.

(2) Term of the agreement is for three years, with provisions for wage adjustment after first and second years, and arbitration of wages if negotiations fail.

(3) Probationary period for new employees can be six instead of three months at supervisor's discretion.

(4) Part-time employees can be used to relieve excessive workload.

(5) The modified union shop will continue.

CAB moves to end Northeast's subsidy

Civil Aeronautics Board has ordered Northeast Airlines to show cause why it should not be placed on a temporary non-subsidy basis as of July 1, 1957.

Board noted that NEA has claimed no subsidy since that date and that the carrier "confidently expects" operations for the ensuing 12 months to be profitable when the anticipated winter season traffic over its New York-Florida route materializes.

Northeast's financial results for the first eight months of 1957 show a total subsidy of $955,246, although none of this was listed as accruing after July 1. Even with this subsidy figure, NEA realized a net loss of $1,785,364 for the eight months.

CAB directed NEA to show cause why it should not be placed on a non-subsidy mail rate last February, but the carrier filed a formal objection. At the time, NEA indicated it would require subsidy at least until July 1, 1957.

Airlines ask reinstatement of military discount

Six domestic airlines have asked CAB to reinstate the 10% military discount which they had discontinued Oct. 1. The discount applies to official military travel on first-class flights and last year produced total revenues of over $46 million.

Carriers seeking to have the discount reinstated are American, TWA, United, Western, Bonanza and Mohawk. Remainder of the industry has granted the discount without interruption since 1949. CAB has approved the practice through June 30, 1958, pending a formal investigation.

The six carriers dropped the discount last month on arguments that reduced earnings dictated against the special reduced fares. With the remainder of the industry continuing the practice, however, the reluctant lines, in requesting reinstatement, told CAB the diversion of military business to other lines forced granting of the discount until CAB completes its investigation.

Export-Import Bank to help Air France buy 17 707s

The Export-Import Bank has joined two domestic aircraft manufacturers and three New York banks in financing the purchase of 17 Boeing 707s, engines and spares by Air France. Transaction, involving some $46 million in funds, marks the biggest jet deal for the organization to date.

Total cost to Air France will be $104.7 million, of which the carrier will pay about $26.2 million in cash. The balance will be paid over a period of five years.

The two major U.S. suppliers, Boeing Airplane Co. and United Aircraft Corp., will carry for their own account about $18 million in deferred payments. Air France is expected to buy parts and spares at a cost of $13.6 million from other U.S. suppliers.

PAA seeks to increase Philippine Air Lines holdings

Pan American World Airways has revealed plans to increase its holdings in Philippine Air Lines to 20% of that company's total stock. PAA already holds 4% of PAL's stock through a purchase made last August. Details of the latest move were disclosed as PAA asked CAB for a determination whether the arrangement requires Board approval and, if so, for such approval.

Pan Am informed CAB that its acquisition stems from an offer by Col. Andres Soriano, PAL president, to become associated with PAL "through the purchase of a part of Col. Soriano's holdings." The offer, PAA added, had official Philippine government concurrence. Col. Soriano continues as president and chief executive officer of PAL and as a substantial stockholder.

PAL has 600,000 shares outstanding, with the Philippine government owning some 54% of its stock. PAA's interest, acquired in August, totaled 25,000 shares. A 20% interest would equal about 125,000 shares or, roughly, a $625,000 investment.

Amis resigns presidency of Aero Design

Rufus T. Amis, president of Aero Design & Engineering Co. since its founding, has disposed of all his holdings in the company and has withdrawn from its management.

George T. Pew has assumed the duties of president in addition to those of board chairman of the Bethany, Okla., aircraft firm, manufacturer of the Aero Commander. W. D. Amis, a vice president, also has withdrawn.

Piper Apache for 1958—more power, higher cruise

IMPROVED VERSION of the Piper Apache features two Lycoming O-320-B, 160-hp engines which increase cruising speed from 160 to 170 mph and add 250 lbs. net to gross weight. New gross weight of 3,800 lbs. allows wider latitude in four- and five-passenger configurations, plus added payload for cargo operations.

William Flynn, The Boston Globe: "Flying in the Boeing 707 is more than a means of travelling from here to there in an unbelievably short time though the distance is thousands of miles. Seven-Oh-Seven flight is winged luxury, comfort—with a complete sense of security—in a peaceful void of blue high above the earth."

Walton and Richard Tregaskis, author team: "Flying in the 707 isn't like flying through air any more. It's as if you were moving through something more nearly solid, like water—as in a submarine, the water holding you firmly and smoothly. It's as if you were held steadily on a track, not just in air. You feel secure and steady, despite the fighter-like performance."

Albert D. Hughes, The Christian Science Monitor: "If the reaction of this and other reporters aboard the flight may be taken as a guide, jet travel will be popular with the public. High-speed flight, moreover, is a pleasant sensation marked with smoothness, cabin quiet and lack of vibration, notably different from contemporary aircraft."

Lucia Lewis, Chicago Daily News: "Taking off in a Boeing 707 is a dream-like thing. No roar of engines, vibration, air pressure changes. The swift climb to 35,000 feet is effortless. You shoot along like an arrow, yet chat in complete quiet. This is utterly restful travel—a feature as sensational as the tremendous speed of the Boeing 707."

The reports above are a preview of what *you'll* experience when you fly in the superb Boeing 707 jetliner. They are by five of the writers who earlier this year flew coast to coast—in 3 hours, 48 minutes—in America's *first* jetliner.

These airlines already have ordered 707s: AIR FRANCE • AIR INDIA • AMERICAN • B.O.A.C. • BRANIFF CONTINENTAL • CUBANA • LUFTHANSA • PAN AMERICAN • QANTAS • SABENA • TWA • VARIG

BOEING 707

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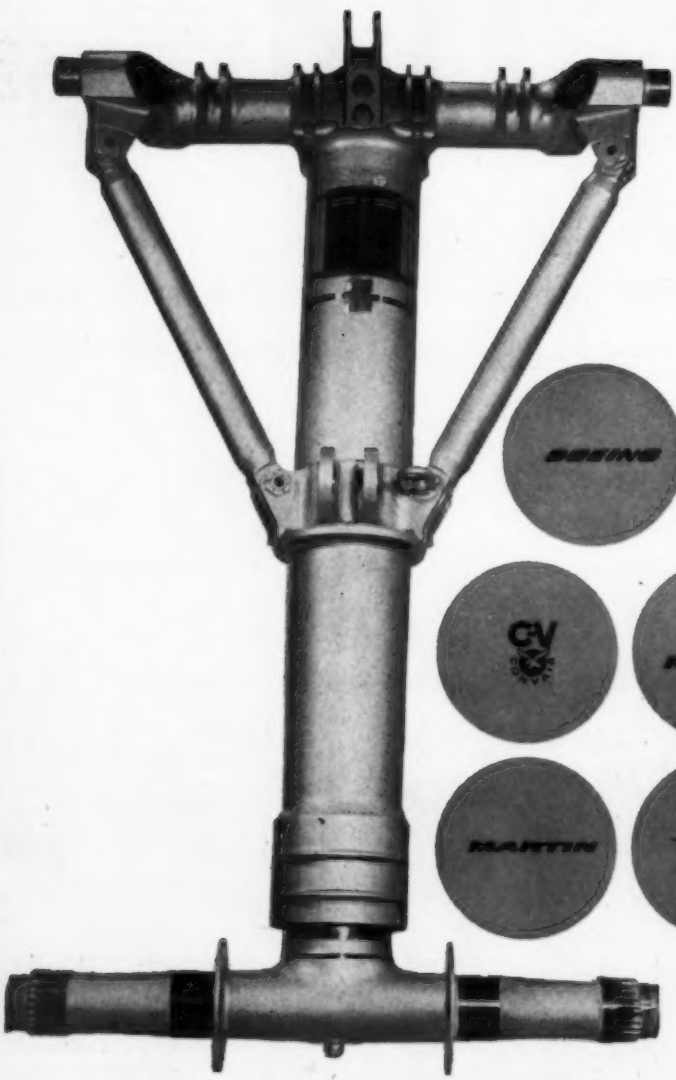
Because "BLUE CHIP" Customers Demand "BLUE CHIP" Specialists in Aircraft Landing Gear



MENASCO is justly proud to be closely associated with these great aircraft manufacturers. Their choice of MENASCO Landing Gear reflects their conviction that they are the very best obtainable for all types of civilian and military aircraft. MENASCO Landing Gear is adaptable to every kind of installation.

The preference for MENASCO Landing Gear to perform the vital functions of takeoff and landing is based upon a number of reasons... the exclusive *Uniwelding* process assures greater strength... MENASCO designs utilize the most effective application of high strength steels, aluminum and titanium for lighter weight and compactness. MENASCO assures *reliability* and *ruggedness* through the highest standards of quality control and thorough operational testing.

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SPECIALISTS IN AIRCRAFT LANDING GEAR

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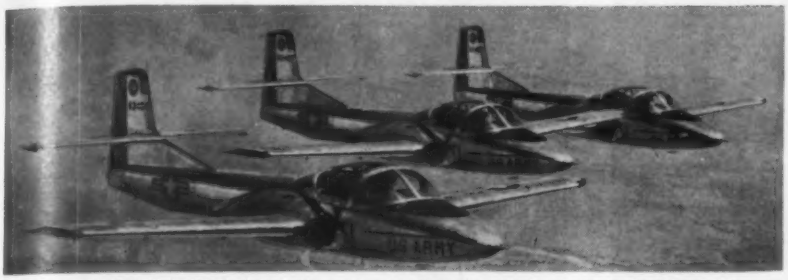
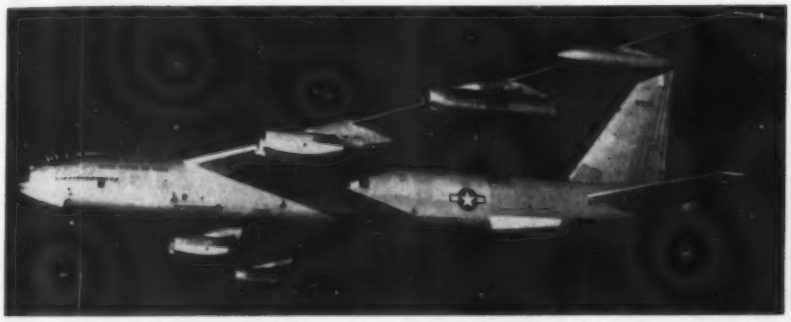
Circle No. 18 on Reader Service Card.

Army tests T-37 for observation program



THREE CESSNA T-37A jet trainers are undergoing tests at Fort Rucker, Ala., to determine if they may be used in Army's high-performance observation aircraft program. The 400-mph jets are powered by two Continental J69-T-9 engines which develop 920 lbs. thrust each.

XB-52 with J75 engines on maiden hop



FIRST OF B-52 SERIES, the "X" model entered a new phase of its career at Boeing's Wichita Div. when it took to the air with two Pratt & Whitney J75 engines replacing four J57 engines in outboard pods. The 15,000-lb.-thrust J75s were installed complete with afterburners on the Stratofortress. Aircraft will be delivered to Air Force for the engine test program after usual flight-testing at Wichita.

Axial-flow turbine for Tu-104

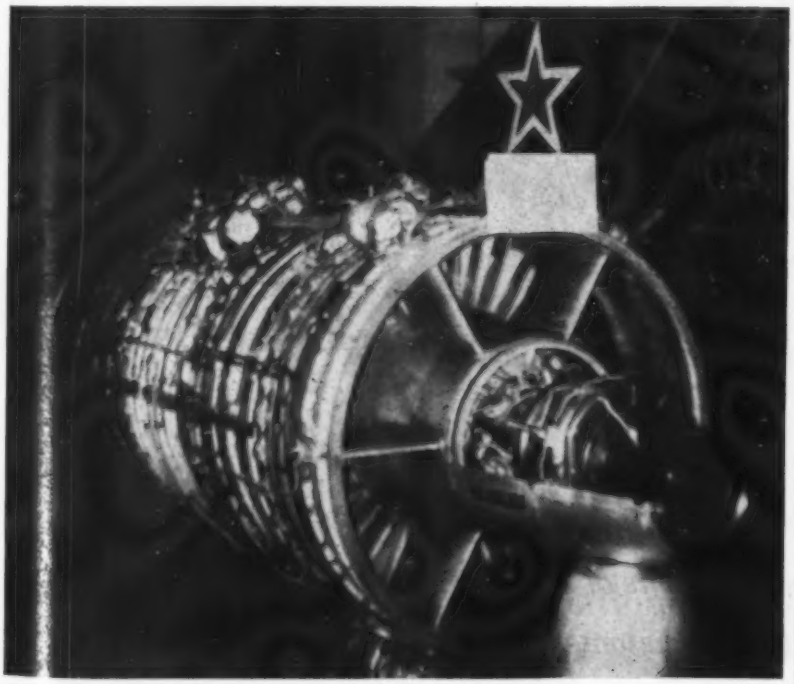


PHOTO of RD-3 (M-209) engine, powerplant of the Tupolev Tu-104 transport, was taken in Moscow Air Museum. Designed by P. F. Zubets, RD-3 is simple axial-flow turbine. Military version develops about 20,000 lbs. but in Tu-104 it is derated to about 18,000 lbs. thrust.

Bill Remmert brought R-W services to Pompano. Behind him, a DC-3 conversion nears completion.

Bob Werner works most of his time at Remmert-Werner's home-base operation in St. Louis.

Remmert-Werner...
Big-Change Artists

Over 200 aircraft conversions . . . thousands of corporate planes maintained and serviced . . . millions of gallons of Shell Aviation Fuel sold to satisfied customers—that's Remmert-Werner's 10-year record!

In June '56, a caravan of three giant mobile units left Remmert-Werner's home base, Lambert-St. Louis Municipal Airport. It was headed for Pompano, Florida.

Bill Remmert met the caravan. Utilizing its complete machine, woodworking, and electrical shops plus radio racks, stockroom and expert mechanics, he established another R-W-staffed base.

"When we took over the Pompano field," recalls Bill, "we needed fueling equipment—fast. Shell engineers came down and designed our bulk plant. And almost before we knew it, there were the three 15,000-gallon storage tanks we ordered waiting out there on flatcars, ready to go. Shell helped us zoom into business."

Besides servicing a good number of America's 28,000 corporate planes, Remmert-Werner also converts surplus commercial and military aircraft into luxury planes for private owners and corporations.

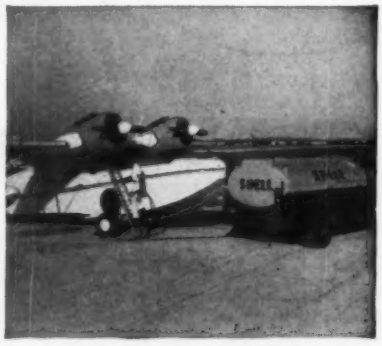
In an ordinary conversion job, R-W rips out every bit of wiring and piping, and installs completely new systems to customer specification. Lounge chairs and sofas, tables, lamps, galleys and any other special furnishings are designed and built by R-W craftsmen.

Among the organizations that happily fly Remmert-Werner conversions are Olin Mathieson Chemical, Grumman Aircraft, Hercules Powder and Owens-Illinois Glass.

"It didn't take long for us to find out that when you're a Shell Dealer, business flies your way," says Bill. "Shell works right along with you, helping you build your business. They've even helped us locate old DC-3's when they've been hard to get. A Shell man spotted some while traveling in Turkey last year. We went right over there and bought them. Most of those '3's' have already been converted into flying yachts."

If their first 16 months at Pompano is any indication, Bill Remmert and Bob Werner are on their way to making R-W service available to America's ever-increasing fleet of corporate aircraft.

Before: C. S. Weaks (right), R-W sales manager, and client discuss plans for a Grumman "Goose."



After: R-W serviceman fuels a converted "Goose" with Shell Aviation Gasoline.

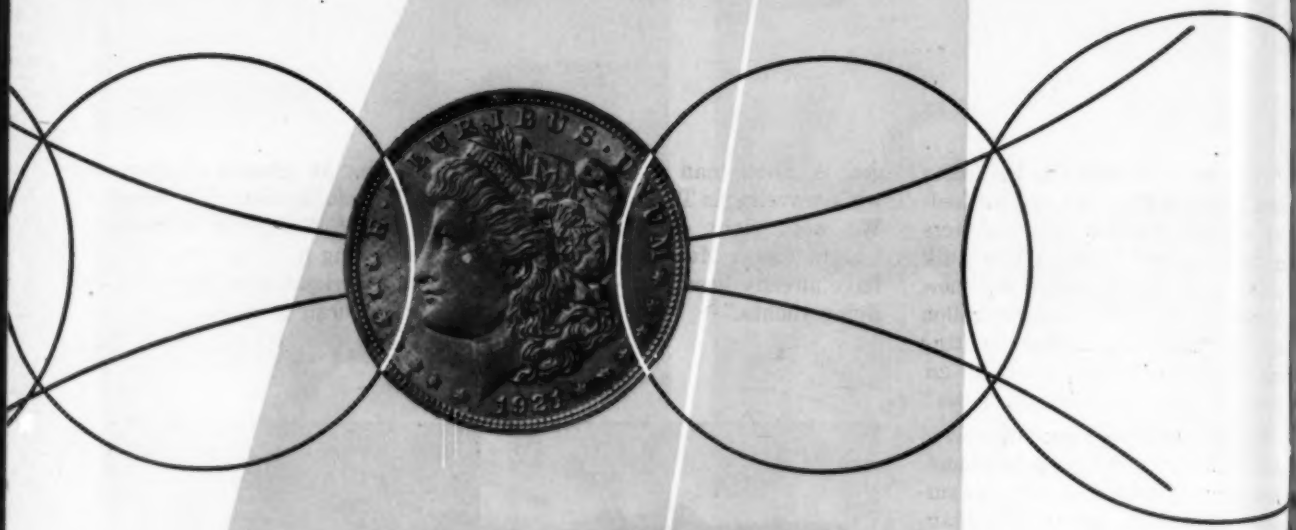
Before: R-W craftsmen remodel interior of DC-3. They'll install new wiring, insulation, picture windows, and furnishings to order.

After: Betty Remmert (right) shows prospective client through completed interior. R-W conversions sell for as much as $300,000.

It pays to be a Shell Aviation Dealer

—and the Shell office nearest you will be glad to show you why

SHELL



STRETCHING the AIRCRAFT DOLLAR

It took Man over 4,000 years to attain a motorized speed of 40 mph. But within the last few decades, aircraft have attained speeds up to 1500 mph, pilotless missiles now travel thousands of miles, and plans are afoot to send guided missiles to Mars and the moon.

Rapid progress of the aircraft industry is an industrial production miracle. Engineers who design a new plane may consider it "obsolete" by the time it is produced, because they already have a better one on their drawing boards.

This fast changing pace of the Air Age, plus current cutbacks in new plane production, illustrates the economic need for aircraft modification. Primarily, Hayes' business is modification of planes—not because they are worn out but because they need to be modernized, and can be modified for a fraction of the cost of new planes. Instead of being scrapped, Hayes modified aircraft go back into service of the National Defense Program at a savings of millions of dollars to American taxpayers.

TO ENGINEERS AND SCIENTISTS

The rapid growth and expansion of Hayes creates a need for aeronautical scientists, aircraft design engineers and graduate engineering students. Good positions are open for those who are qualified. Hayes now has over 10,000 employees and is a competitive industrial facility for modification and maintenance of aircraft, including guided missile work. Write Personnel Department, P. O. Box 2287. Dept. 405

Hayes
AIRCRAFT CORPORATION
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ENGINEERS • DESIGNERS • MANUFACTURERS • TECHNICAL PUBLICATIONS

Economy pinch?

Air Force information service programs are feeling the pinch of Pentagon economies. Lack of funds, for instance, has caused cancellation of such future projects as:

Distribution of coloring books to children visiting AF bases.

Plans to make up and distribute scale model drawings of USAF aircraft to model airplane enthusiasts.

A plan to have qualified AF officers deliver commencement addresses at their hometown high schools also has been canceled (except where funds are available locally).

Missile slow-down

Driver of a small imported truck carrying missile components was arrested recently for driving too slow on one of the Los Angeles freeways.

A jury found him innocent, but the judge commented:

"The court can understand now why the U.S. is behind Russia in the ICBM program when trucks carrying guided missiles are going only 28 mph."

Things are looking up!

It seems that no phase of American activity will escape the influence of the Russian earth satellite. Right after the Soviet announcement a worried-looking old lady tapped the captain of a Bonanza DC-3, boarding passengers at Phoenix, on the shoulder. "How high is that Russian thing?" she asked nervously.

When the pilot explained that Sputnik was orbiting at some 360 miles above the earth, the woman sighed and took her seat, considerably relieved.

How to shorten landing times

Max Karant, the articulate vp of AOPA, cites some interesting figures for air traffic controllers to ponder. During the recent open house at Piper's Lock Haven, Pa., facilities, 650 aircraft were landed in little more than an hour, or one plane every 6.5 seconds. This included some DC-3s. Says Max: "If the field had a tower, it would have taken five hours to land that many aircraft."

Abbreviation conflict

A USAF campaign is under way to substitute the words "liquid oxygen" for the formerly used "LOX" abbreviation. Purpose is to avoid conflict with "L.O.X.," the commercial and industrial designation for liquid oxygen explosives.

Probable corrective action to avoid dangerous and possibly disastrous results will be deletion of "LOX" from all technical orders and directives and substitution of "liquid oxygen," re-identification of containers with the words spelled out, and development of a color-coding system for liquid oxygen containers, pipes or systems.

Sky King on the ball

Sky King, cowboy-pilot and idol of millions of young television viewers, has stepped up the pace in his running battle with rustlers and other evildoers in the wild and high-flying west. Finding his twin-engine Cessna UC-78 Bobcat not quite fast enough, and maintenance problems at the ranch a little troublesome, Sky has traded the old plane in on a Cessna 310B.

Name the Moon!

Beleaguered officials assigned to the U.S. earth satellite program in the Office of Naval Research are smiling feebly by now over cracks about the Soviet coup—but one more is irresistible. Let's call it "Project Off-Guard!"

Wonders about Wallaby hides

R. E. Gaston of Pittsburg, Kans., writes: "We wonder if the Wallaby hides mentioned in Fred Hunter's column (AMERICAN AVIATION, Sept. 23, p. 73), which are going to be used to cover the armrests of Qantas' Boeing 707s, will include the pouch for holding advertising literature?"

Jet age hotel boom

"In the jet age, more than twice as many people will be arriving at hotels by air," William Morton, president of the Hotel Sales Management Assn., told Southern California chapter of the association at a meeting in Los Angeles.

Coast-to-coast profit: $3.75

American Airlines says that if its ton-mile profit in a recent month is translated into profit on the sale of passenger transportation, it netted $3.75 on a passenger carried from New York to Los Angeles.

Using this example to reemphasize the need for a fare increase, AA points out that in the first seven months of 1957 it earned 2.1¢ per ton-mile for all traffic transported, against 3.8¢ in the same 1956 period. But in July, usually a good month, this profit sank to 1.5¢. Translated into profit on passengers, AA says this is equal to a net of $37.50 for transportation of 10 people from New York to Los Angeles, or $3.75 for each sale. (One passenger with baggage is figured at 200 lbs., and 10 passengers equal one ton. Mileage is 2,500, and that figure multiplied by 1.5¢ is $37.50.)

Probing the probers

CAB Chairman Jim Durfee has publicly expressed his displeasure with some of the tactics and demands of the Moulder Subcommittee for personal files of Board Members. But the displeasure turned to near frustration recently when a Subcommittee investigator demanded production of Durfee's personal file on "the Moulder Subcommittee."

NAME PLAQUES, somewhat like the plates used on generals' automobiles, have been presented to all TWA captains for use aboard their aircraft. Metal plaques, complete with four stars and lettered in white on a red background, are first placed in the passenger-loading-step holders and then in the cabin of the plane. Photo shows TWA Capt. J. C. Bashioum inserting his plaque as president Carter L. Burgess watches.

U. S. Air Force Photo

"Moby Dick" high altitude research balloon being launched from a special protective trailer at AFMDC. This balloon carries instruments up many miles. Small sized balloon alongside provides launch crew with information on surface wind velocity and direction.

SCIENTISTS ARE OPENING DOOR TO OUTER SPACE AT AIR FORCE MISSILE DEVELOPMENT CENTER

Almost 4000 square miles of desert comprise the rocket and missile test range at the Air Force Missile Development Center at Holloman AFB, near Alamogordo, New Mexico. In another sense, the test range is limitless, extending upwards to the reaches of space. It is one of AFMDC's missions to extend our knowledge of these extreme altitudes, to prepare man for life above the atmosphere—this in addition to extensive development and test work with missiles and similar weapons.

AFMDC is one of the centers of the Air Research and Development Command. In addition to its basic mission, it works with other ARDC centers, government agencies and industrial contractors in electronics, weapons, and upper atmosphere research.

Undergoing tests at AFMDC are surface-to-air and air-to-air supersonic missiles for intercepting hostile aircraft; air-to-surface missiles; surface-to-surface guided missiles, and many similar weapons.

Instruments and biological specimens are carried skyward in experimental rockets and balloons at AFMDC for studies of radio wave propagation at high frequencies; investigation of electrical characteristics of the ionosphere and composition and acoustical properties of upper atmospheres; studies of the intensity of radiation from the sun, from nocturnal space, and from the earth; studies of high altitude winds, and studies of the biological effects of cosmic radiation and reduced gravity. This high altitude research is useful in the development of missiles, aircraft, and associated equipment.

Gleaning this useful information is a long and difficult business which draws upon the skills of thousands of civilian and military engineers and their many counterparts in private industry. The efforts of this small army of technicians will not only determine America's ability to meet potential aggressors, but bring ever closer the coming Age of Space.

This is one of a series of ads on the technical activities of the Department of Defense.

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Technicians in Ford Instrument's gyro laboratory perform tests on subassembly from missile guidance system.

ENGINEERS of unusual abilities can find a future at FORD INSTRUMENT CO. Write for information.

Following the IATA trail from Madrid to Miami

by Anthony Vandyk

THE DOINGS of the International Air Transport Assn. have taken this writer from Madrid to Miami in the past few weeks. At Miami it was the very formal and highly social annual general meeting (AMERICAN AVIATION, Sept. 23). There wasn't much really hot IATA news to report at Madrid but there was plenty of interest to be derived from the side events arranged in connection with the meeting in the Spanish capital.

Spain's largest transport, the CASA Azor, was demonstrated for the first time to international airline prospects. It was rather embarrasing to ride in this well-built, strictly conventional, "new" but already obsolescent aircraft. The Spanish team that designed and built the Azor was aboard and naturally hoped for compliments.

Certainly there was nothing bad about the aircraft but there was little unusual in a model that at best could be described as a somewhat smaller, unpressurized equivalent of the Convair 240. The two Bristol Hercules engines of the Azor give it a good takeoff and landing performance and the best possibility for the 30/40-passenger, 37,500-lb. aircraft might be as a DC-3 replacement.

Also being demonstrated during the IATA Madrid meeting was the Fokker F-27, perhaps the best known "DC-3 replacement." This was the second prototype and it was fully equipped with passenger accommodations. Last year this writer flew in the cockpit of the unfurnished first prototype and was highly impressed. The second aircraft confirmed the high opinion gained in the first.

Passengers really appreciate the high wing because of the excellent visibility it affords. Noise and vibration levels are equivalent or less than those in a Viscount. The second F-27 prototype's cabin is equipped with a somewhat unusual multicolor scheme which makes the interior rather gay.

The third aircraft which was demonstrated at Madrid was the Caravelle. The Sud-Aviation jet arrived in the Spanish capital with a large number of Italian aviation executives aboard. Subsequently it became known that Italy's giant Fiat company is to work with Sud-Aviation on Caravelle subcontract work. It seems that Alitalia-LAI, the merged Italian airline is likely to buy some of the aircraft.

The IATA meetings in Madrid and Miami could not have been more different. At Madrid the presence of the press was welcome—in Miami it was not. The Miami meeting was the Joint Traffic Conferences annual meeting which sets worldwide rates and fares—or at any rate attempts to do so. This year it failed to reach agreement on the key issue of transatlantic fares and that phase of the deliberations had to be recessed until next month.

Certainly failure to agree on North Atlantic fares did not result from lack of trying. Meetings went on continuously every day from nine in the morning until midnight. Paper work was enormous—the advance agenda contained 795 pages while more than 700 additional documents were issued during the four-week meeting.

There were no demonstration aircraft for the delegates to ride in. In fact the most interesting aircraft at Miami during the meeting, BOAC's first long-range Britannia, was surrounded by a 24-hour police guard. This plane was awaiting new engines to replace the two which suffered mechanical trouble during a proving flight from New York to Miami.

After having looked at this stranded Britannia it was interesting to discuss it with the crew of the Northeast Airlines DC-6B returning to Washington, particularly after having been present at the press conference in New York when Bristol and Northeast announced postponement of deliveries of Britannias to the U.S. carrier until next fall.

The DC-6B crew was still enthusiastic about the turboprop aircraft and hoped that eventually Northeast would in fact operate it. But the main object of the crew's enthusiasm was the DC-6B, one of 10 new aircraft which are operated by Northeast in coach service down the east coast. These certainly are among the most comfortable coach aircraft in operation—76 two-abreast seats and a lounge in the rear. The crews particularly like the radar.

The use of Northeast Airlines was due to National Airlines being on strike.

It was sad to look around the new modern headquarters building of National at Miami and see just a handful of executives and two or three secretaries at work. Equally sad was to look around the maintenance base with $25-million worth of aircraft standing around idle. Among them was National's first L-1049H Super Constellation (equipped with 104 seats) and the carrier's first DC-7B.

Miami is always a fascinating airport to visit and it is rare that one goes there without seeing some unusual aircraft. In addition to those mentioned above there was a Boeing 307, one of the original Stratoliners, which is now used on the domestic services in Haiti operated by the air force of that country. Like most of the aircraft of the Caribbean and Central American republics it is overhauled by one of the several extremely competent overhaul firms based at Miami Airport.

During this writer's stay in Miami the L. B. Smith Aircraft Corp. overhaul facility was formally dedicated and this and other aspects of the fast-growing aviation scene in Miami will be described in future issues.

BRIEFS

TACA International Airlines will introduce Viscount equipment on its routes Dec. 2. Initially the turboprop aircraft will fly between New Orleans and San Salvador via Guatemala City, and between Mexico City and San Salvador via Guatamala City. The Viscount equipment is being leased from Philippine Air Lines pending purchase of a small quantity of the aircraft . . . **TAE**, the Spanish airline, has ordered three Scottish Aviation Twin Pioneers with Alvis Leonides powerplants.

SAS' eight remaining SAAB Scandia transports have now been sold to the Brazilian VASP airline in Sao Paulo for $4 million . . . **Borneo Airways** is a new carrier set up to operate services in Borneo previously flown by **Malayan Airways**, which along with **BOAC** own 49% of the stock. The other 51% is held by the governments of Brunei, North Borneo and Sarawak . . . **La Nica**, Nicaraguan airline, is reported to be planning to start international passenger services. At present the carrier's only international service is a twice-weekly all-cargo flight to Miami.

SAS' winter schedules that went into effect on Oct. 6 show Convair 440 and Douglas DC-6 equipment is being used on flights to Moscow hitherto operated with SAAB Scandias . . . **OLAG** (Austrian Airways) has been formally constituted in Vienna and will start operations next spring using four Viscounts chartered from Fred Olsen. The Norwegian independent and SAS each own 15% of the stock of the new Austrian airline. The other owners of the airline are the two major Austrian political parties—the conservatives have a 42% holding and the socialists 28%.

AMERICAN AIRLINES FLEET NOW 100% EQUIPPED WITH BENDIX IGNITION ANALYZERS!

We are very proud that American Airlines has chosen the Bendix* Ignition Analyzer as the standard equipment for its entire fleet of aircraft. On American's four-engine aircraft the analyzer is permanently installed as airborne equipment. Two-engine aircraft are prepared for portable-airborne analyzer usage.

American Airlines has used the Bendix Ignition Analyzer for quite some time. The decision to prepare the entire fleet of aircraft for use with this analyzer was made after long usage had shown this to be the most suitable equipment for American's requirements.

Major airlines, military services, and corporate aircraft operators have found the Bendix Ignition Analyzer to be a vital and almost indispensable piece of equipment to reduce costs by improving maintenance and operating efficiency. The analyzer plays an important role in reducing en route and turn-around delays, thus improving customer convenience and satisfaction.

The Bendix Ignition Analyzer is a sound investment that will pay for itself within a short period. We would be pleased to provide complete information as to the most convenient and economical analyzer installation for your aircraft.

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Gen. Ira C. Eaker (USAF, ret.)	Dir. eastern offices in U.S., Douglas Aircraft Co.	VP, Hughes Tool Co.
Brig. Gen. John M. Sterling (USAF, ret.)	Asst. to vp-European operations, Republic Aviation	Central Intelligence Agency
Maj. Gen. Roger J. Browne (USAF, ret.)	Dir. defense products, American Brake Shoe Co.	Commander First Air Force, Mitchell AFB, N.Y.
C. Douglas Flanigen	Chief engr., Lycoming Div., Avco Mfg. Corp.	Consultant engr.
Heston H. Cherry	Weapon system mgr., WS 202A (YF-108), North American Aviation	
Walter C. Robertson	VP, American Bosch Arma Corp.	Project engr., Navaho
David Eaton	VP-mktg., Reaction Motors, Inc.	Consultant, Washington, D.C., and New York
Dr. R. J. Creagan	Dir. nuclear program, Bendix Aviation Corp.	VP-program management
Brig. Gen. William L. Bayer (USA, ret.)	Mgr. military mktg., Electronics Div., Stromberg-Carlson	Design engr., Westinghouse
Jack L. Shafer	VP-sales, Tensolite Insulated Wire Co.	Cmdr. Army Signal Supply Agency, Philadelphia
Robert A. Bailey	Mktg. mgr., Norden-Ketay's Western Div.	Gen. sales mgr., Plastics Div., Curtiss-Wright
Walter Newcamp	New products mgr., Specialties Div., Curtiss-Wright	VP and sales mgr., Engineered Electronics Co.
David A. Nadel	Asst. sales mgr., Epsco, Inc.	Dir., Order and Contract, Curtiss-Wright Europa
Donald A. Garr	Mgr. engrg. operations, GE Light Military Electronic Equipment Dept.	Sales consultant
Frederick H. Guterman	Gen. mgr., Technical Products Div., Allen B. Du Mont Laboratories, Inc.	Mgr., Industrial Electronics Laboratory
Frank G. Denison	Dir. research and development, Clary Dynamics	Asst. vp American Bosch Arma Corp.
John Dill McKenney	Chief engr., research and development, Clary Dynamics	Dir. weapon system development program, Jet Propulsion Laboratory
B. B. Bundesman	Commercial sales mgr., Jetstar, Lockheed-Marietta	Head, ground equipment section
David T. Crockett, Jr.	Military devel. sales mgr., Lockheed-Marietta	Sales mgr. B-47 and special projects
Douglas P. Wheeler	Military contract sales mgr., Lockheed-Marietta	Military sales representative
James B. Constable	Modification and ANP manned aircraft sales mgr., Lockheed-Marietta	Project coordinator, C-130
William D. Perreault	Export military sales mgr., Lockheed-Marietta	Spare parts mgr.
Edward T. Donahue	Sales mgr., Hello Aircraft Corp.	Military sales representative
Herbert I. Chambers	Chief devel. engr., Consolidated Electrodynamics Corp.	Demonstration pilot and regional sales mgr.
Charles L. Lord	VP and controller, Electronic Communications, Inc.	Asst. chief devel. engr.
Dr. Raymond L. Garman	VP-engrg. and research, General Precision Equipment Corp.	Controller and treasurer
Herbert C. Golz	Gen. mgr., Elgin Metalformers Corp.	Chm. of bd. and tech. dir., General Precision Laboratory Inc.
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WEST COAST TALK

by Fred S. Hunter

Will Lockheed fly Electra before Boeing gets 707 into air? Chances seem slim right now

FIRST FLIGHT of the turboprop Electra is scheduled for January 31, 1958, but Lockheed would like to beat this date, if possible. Without overtime, that is. It would be fine for the morale in Burbank if Lockheed could contrive to be first in the air, ahead of Boeing. The chances of this happening are pretty slim, though. Last we heard, first flight of the No. 1 Pan American production 707 is down on the Boeing calendar for Dec. 27 this year, and even if a Burbank rumor that the schedule may slide over into January turns out to be true, the margin still favors Boeing.

It's interesting to note that the current price of General Electric's new model CJ805-3 turbojet engine for the Convair 880 is the same as that of Pratt & Whitney's later model JT3-C6 for the Boeing 707 and Douglas DC-8, $155,000. Thrust is practically identical, 11,200 pounds dry. The two-spool JT3-C6, of course, is heavier than the one-spool CJ805-3.

Originally, GE had a price advantage with a price tag of $125,000 for the Dash I engines first ordered by TWA and Delta for their 880s. Subsequently, both carriers decided to change to the advanced model, which will provide better hot-day performance. Takeoff improvement in the Dash 3 over the Dash 1 on a 100-degree day is about 10%. It's obtained through the use of new materials and other changes to up the temperature approximately 100 degrees and also accomplish an increase in the rpms.

To its great surprise, Continental Air Lines found that more than 75% of the passengers ordering meals on its DC-7B custom coach schedules order the $2.50 steak dinner rather than the more economical $1.25 chicken dinner. To its pleasant surprise, it also discovered that more than 50% of those ordering food also order a pre-meal cocktail at $1 per copy. On one schedule, a 6:30 p.m. eastbound departure to Chicago with a stop at Kansas City, CAL has to schedule three stewardesses to handle the load.

Reports from Hurricane Mesa indicate that tests of Convair's upward ejection "bobsled" seat are showing it to be extremely stable with no tumbling effect. This is at classified speeds, which perhaps may be close to Mach 1.8. Trajectory of the "fanny first" system is reported somewhat flatter than normal upward systems, with the seat seeming to "float along, just above the test vehicle until the pilot-seat separation point is reached."

Lockheed is scheduled to turn its Model CL-329 turbojet executive transport over to the Air Force for Phase 2 flight-testing in December. This prototype aircraft is powered by two Orpheus engines contributed to the Lockheed baby jet project by Curtiss-Wright. The General Electric J85 engine, scheduled for a four-engine configuration, is still some months away, and a good showing by the twin-jet version in the tests could give Lockheed quite a jump on the competition and also open the way for another engine line for Curtiss-Wright. Provided, of course, the Air Force finds some money to buy the airplane.

Austerity, if we can call it that, hasn't dimmed Lt. Gen. Clarence S. Irvine's sense of humor. On a recent visit to the Boeing Airplane Co., the Air Force deputy chief of staff for materiel joined in a coffee break. "No doughnuts?" grinned Irvine. "I didn't know we were carrying the economy drive this far."

Pratt & Whitney recently bettered its maintenance guarantee on the JT4 (J75) engine from $32 to $28 per flight-hour. . . . The "sudden death" decision in the WS-110A competition between Boeing and North American may come any day now. . . . Boeing is reported to have flown the 707 prototype on only one engine for a period of 15 minutes without loss of altitude in a demonstration of the jet transport's engine-out performance capabilities. . . . New research and development company formed by Ed Schmued, former vice president-technical of Northrop, will engage in projects outside as well as within the aviation field. . . . C. R. Smith is lending several paintings from his collection to the new Dallas Admirals' Club. . . . And if you want to know whether Terry Drinkwater, president of Western Air Lines, has a weakness, we'll tell you what it is—cable cars.

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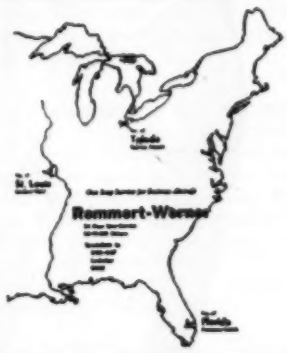

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TRANSPORT CHANGES

Donald J. Herring, sales rep. for Northwest Airlines, moves from Washington, D. C., to Seoul; **Charles A. Dinardo,** agency and interline rep. in Pittsburgh, goes to Philadelphia.

R. R. Lawson, formerly with National Airlines, has joined Northeast Airlines' Miami sales staff.

Edward A. Jones promoted to district sales mgr. for Northeast Airlines in Philadelphia.

Jacques E. Turner appointed southeastern district mgr. for Air France in Miami.

Pieter Nieuwenhuys named manager of new Air France office in Houston.

Riley R. Wright named traffic and sales representative for Chicago Helicopter Airways.

Frederick A. Quanjer promoted to agency and interline mgr. for Swissair for North America; **Otto Baumann** named asst. passenger traffic mgr.; **Mrs. Joan Scire** succeeds Baumann as reservations mgr. for North America; **Walter Egert** promoted to reservations supv.; **Raymond Ghilain** to tariffs supv.; **John Logan** appointed resident sales rep. in Pittsburgh; **William Shaw** named New York cargo district mgr.; **Melvin Sibulkin** promoted to cargo sales promotion mgr.

Floyd K. McCroskey named division personnel mgr. for United Air Lines in the Pacific Northwest.

Thomas M. Darrow named Philadelphia station mgr. for Riddle Airlines.

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EN ROUTE

by Wayne W. Parrish

New Guinea: land of strange contrasts

WHEN I TELL YOU that the highest airstrip in New Guinea is 8,100 feet above sea level that's only one-tenth of the story. It's 8,100 feet at the top end. The lower end must be no more than 7,500 feet. It was laid out on the razor-back ridge of a high mountain in the midst of a group of high, forested mountains and is the damndest place I ever have landed or hope to land again. It is called Keglsugl.

Jack Stammer, who piloted the Qantas Beaver, had landed there twice before, but Orm Denny, who's as genuine a pioneer as there is on this globe, confessed he had never been there. Normally the strip is used by a Cessna 170 which supplies the mission at the bottom of the canyon.

We flew for quite a while through valleys and over ridges, often above broken cloud layers, and I was wondering where in the world an airstrip could ever be built because there weren't any two successive square feet of ground on the same level. But we rounded one range and here was this strip running at an almost unbelievable angle up the ridge. We landed the only way possible, uphill, and it was pretty rough going. It took plenty of power out of that 450-hp. Wasp Jr. to taxi to the top where we got out and looked down the steep slope with considerable awe.

Town developed by air

Qantas serves the place infrequently as Keglsugl isn't exactly typical of New Guinea; it just happens to be one of the toughest and most inaccessible. But missionary pilots use it regularly. The takeoff was thrilling. The point of no return is reached in nothing flat.

Nestled in the center of New Guinea are some beautiful highland valleys and one of the most bustling of the newly-developed spots is Goroka which has 600 Europeans and 15,000 natives in the district and some 59 new coffee plantations. There is now a road of sorts to Lae on the coast, requiring 7½ hours of tough driving, so most of the supplying is still done by air, including fuel in rubber bags. There's a good 5,500-foot strip suitable for DC-3s. Almost the whole town was developed by air, including air-shipping of automobiles. There are now 600 miles of roads up there.

There's a hotel of sorts and I was told it was going to have a new management. It needed improving. But the town itself is attractive. Native men in the area use pig fat on their hair, a somewhat gruesome sight and capable of exuding a pungent odor. Most have fancy hair-dos.

Quite a few native women are all-but-nude, wearing only a loin cloth plus a grass tail swishing on the rear. In this area the natives within a three- or four-day walk are being brought into civilization and given help and land to farm. Those within a week's walk are still killing each other in stone-age fashion. Goroka is one of numerous civilized spots gradually taking over from the jungle.

Those of you who flew in New Guinea in World War II will be interested to get caught up on the old airfields there. Flying back to Lae we passed over Gusap fighter base. The old main strip has been abandoned but the main taxi strip has been re-surfaced and is used for occasional transport stops. The fighter plane parking areas are still well marked from the air, as are locations of buildings, but no structures remain.

Nadzab had four big strips in World War II. The main bomber runway is being maintained but two others appear unusable and the third in doubt. There is not a building left on what was once a big installation. It is only a matter of time until vegetation takes over the place, but even today the outlines of the base are quite clear.

Before World War I, the eastern part of New Guinea was divided between Papua (Australian) on the south and German on the north. From then on until today, the eastern half has been mandated to Australia and I must say the Aussies have performed with great credit. There have been moves made in the United Nations to turn New Guinea over to the natives but I recommend that anyone who makes such a proposal be dropped by parachute into the hinterland, and thus into the stone age, and he'll change his mind pretty fast if he ever gets out. The time when New Guinea natives can govern themselves is quite far in the future.

Hat's off to Haugland

Since returning to the U.S. I got a copy of a little book entitled "Letter from New Guinea" written by Vern Haugland of Washington, aviation editor of The Associated Press, who parachuted out of a disabled bomber in New Guinea in 1943 and lived to tell the tale. He bailed out on August 7 and it was five weeks later, Sept. 11, before he was found by missionaries, and Sept. 23 before what was left of him reached Port Moresby.

Having seen the country, I was even more impressed by Haugland's survival all that time in the jungle. I'm sure I couldn't have done it. Luckily, he wasn't farther west in the stone-age country, but was in an area where some natives had had earlier contact with white men. Vern's book is a truly remarkable story but he's so modest that it was only by chance I heard about it. The war was pretty rough out there.

Orm Denny, who runs the Qantas Empire Airways show in New Guinea, isn't concerned only with an airline in the mountainous interior. He also operates a service far out on the easterly island chain to Rabaul and on beyond to Bougainville. A DC-3 leaves Lae each Monday. The pilot is the free-lance boss of what amounts to a tramp air steamer and he may return Tuesday night or it may be Friday. At the fourth stop if a local shipper has a plane-load going somewhere, the other passengers and cargo just wait until the special load is delivered. The pilot usually sets rates, collects the money, and serves as salesman, broker, manager and whatnot.

In addition, Denny has two Catalinas and a Beaver on floats for some 26 bases on lakes, rivers and coast villages. Seven DC-3s and three Beavers serve local routes with DC-4s connecting for Australia. He also puts 50 canvas seats in a DC-3 to carry natives on charter to work projects. Yes, I said 50, believe it or not.

They travel frequently

Last year (1956), Qantas carried 65,472 passengers in New Guinea and 12,415,000 lbs. of cargo including mail. The European population amounts only to 15,000, but these account for a lot of air travel. Golf, bowling and other sports teams are continually flying from one town to another for matches. It's about the only means of transport, since many roads are flooded a lot of the time. Qantas doesn't expect to make money on the service—it's a chore on behalf of the government to help develop the country. But recently it's been in the black.

As I ended my New Guinea visit it was hard to realize I had flown only 390 miles in the interior, but those miles covered a whole gradation of civilizations. With an estimated two million natives, many still in the stone age, Australia is trying to develop the land for both natives and Europeans. In contrast to Africa where the European grabbed off the best for himself, the natives in New Guinea are being given opportunities to develop their own land, even coffee plantations. More and more schools are opening. Natives are being moved ahead in all sorts of jobs up to the measure of their capabilities. Qantas has 300 natives on its staff.

New Guinea is a lush land with many potentials. It should grow everything that Java grows, and then some. It has tropical lowlands and tropical highlands, plenty of rain and an all-year climate. It is a perfect testing area for airplanes, for air has been the primary transport from the start of development in 1927 with the first gold fields. To Orm Denny and Jack Stammer and all the others at Qantas who are making a solid contribution, all the best to you—and many thanks for one of the most fascinating episodes and experiences in my somewhat cockeyed life.

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